COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Weekly Newspaper Second-class postage paid at Boston, Mass., and additional mailing offices © 1976 by Computerworld, Inc.

Price: $15/year August 9, 1976 Vol. X, No. 32

NEWSPAPER

At ICCC

FCC Chief Calls Policy 'Conscious Flexibility'

By Ronald A. Frank
Of the CW Staff

TORONTO – The current policy of the Federal Communications Commission (FCC) toward data communications is one of "conscious flexibility," with the commission relying on the economic and technical judgments of the marketplace, according to Richard E. Wiley, FCC chairman.

Speaking at the opening session of the Third International Conference on Computer Communication (ICCC) here last week, Wiley said this policy approach is being applied in such areas as the selection between packet and circuit switching, between satellite and terrestrial transmission media, between general-purpose and specialized networks and between different terminal devices.

'Inevitable Competition'

Rather than referring to "contrived competition," it would be more appropriate to talk about "inevitable competition," the FCC chairman told the conference attendees.

This competition is inevitable because in the postindustrial era there are growing numbers of specialized applications of telecommunications that can improve people's standard of living and there are a growing number of firms and individuals with ideas and products to satisfy those needs, Wiley said.

If current FCC policies were to be characterized in a single word, that word would be "freedom," Wiley indicated.

(Continued on Page 6)

Datapac Debuts Using Nonintelligent Units

TORONTO – The Canadian Datapac data communications network is operational and will begin serving customers within the next few months.

The inaugural demonstration was held here last week by Bell Canada and officials of the Trans-Canada Telephone System during the International Conference on Computer Communication (ICCC).

The demonstration of the intelligent packet-switching network included nonintelligent terminals connected to the network via a network interface machine (NIM). The terminals transmitted data at speeds of 300- to 1,200 bit/sec to the Toronto Datapac node.

From this node, messages were transmitted at 9,600 bit/sec to an IBM

(Continued on Page 4)

New Definitions Proposed

FCC Renewing Computer Inquiry

By Ronald A. Frank
Of the CW Staff

WASHINGTON, D.C. – The Federal Communications Commission (FCC) has initiated a second Computer Inquiry to update its original 1971 decision and apply current definitions to the boundary between data communications and data processing.

In approving a second inquiry, the commission said distributed networks in which CPUs and terminals are performing both data processing and "communications control applications" had been one of the developments "tending to cause a blurring" between the two major areas.

Users are finding it cost-effective to remove some of the computing power from the DP center and distribute it to terminals or incorporate this power "into the network itself," the FCC noted.

Under proposed amendments to its earlier Computer Inquiry decision, the commission issued a more specific definition of data processing and also proposed eliminating the concept of hybrid service. Interested users and others are being urged to comment on the FCC proposals.

Data processing would be defined "as the use of a computer for the purpose of processing information wherein (a) the semantic content, or meaning, of input data is in any way transformed, or (b) where the output data constitute a programmed response to input data."

Provisions for Carriers

Under the proposed changes, common carriers would be allowed to use DP for "network control and routing," which would include message and circuit switching, speed and code conversion, pulse format conversion, error detection and correction, analog-to-digital and digital-to-analog conversion, signal processing and time division multiplexing.

Carriers would also be able to use DP for input/output processing, which would include using a computer in a network to make different types of CPUs and terminals compatible with each other.

Carriers would be barred, except through separate subsidiaries, from providing "arithmetic processing, word processing or process control." The separate subsidiaries could engage in "general commercial accounting, payroll, inventory control, banking and point-of-sale processing, financial and econometric modeling, scientific calculations, etc."

Word processing as defined by the commission includes "interactive information retrieval systems, management information systems, text editing, translation, typesetting, etc."

Under process control, the FCC would include applications where a CPU is used "to monitor and control some process which is occurring continuously," such as generating stations and automatic ma-

(Continued on Page 4)

File Match-Up Uncovers $250,000 Welfare Fraud

By Catherine Arnst
Of the CW Staff

NEW YORK – After a computer match-up of welfare rolls and payroll lists, the Bronx district attorney ordered the arrests of 42 state and city employees for allegedly collecting $250,000 in fraudulent welfare payments over a three-year period.

Twenty-nine were arrested late last month; the others are still being sought. The mass arrests were made partially "to emphasize a point," District Attorney Mario Merola said.

"If [state and city] agencies would make a simple check of their employee rolls by running the names and Social Security numbers through the welfare computer, these rip-offs would be brought to an immediate halt," he said.

The arrests originally stemmed from anonymous tips received by Merola's office and the Human Resources Administration (HRA). A check was made on the HRA's IBM 370/158 to see whether each person was actually working for the state or city and simultaneously collecting welfare.

None Previously Arrested

The amounts collected illegally by the 42 charged with larceny ranged from $1,500 to $24,000 each, Merola said. None of those arrested had criminal records.

Ironically, one source noted, the arrested employees are in low-salaried positions and some would have been eligible for welfare if they were heads of households and had applied for the funds. The top salary in the group was $9,500.

Since January, 80 public employees have been arrested with the computer match-up method, Merola said. About 90% of the arrests resulted in convictions, according to Det. Salvatore Giunta, head of the Welfare Fraud Bureau of the district attorney's office.

Giunta stressed that if each public agency ran a check with the Welfare Department's computer whenever a new employee was hired, welfare fraud could be cut down enormously. "A good 80% of welfare fraud is concealed employment," he estimated.

"When the Police Department submitted 500 employee names, they came up with 50 cases of fraud," he said. All the district attorneys' offices check new employees through the computer match-up system when they are hired, he said.

In the first seven months of 1976, $11 million was saved by stopping welfare fraud with this method, HRA said. After making such a match-up in November 1975, the department cut off assistance to 1,505 cases and reduced payments in 726 cases.

UK Omits DP Experts in Group Created to Frame Privacy Laws

By Joseph Hanlon
Special to Computerworld

LONDON – The Home Secretary has announced the makeup of the Data Protection Committee (DPC) – and not one computer expert was named to the body mandated to frame legislation for controlling data banks.

While one member of the computer industry was included, his appointment has only added to the controversy surrounding the DPC appointments. He is John Hargreaves, IBM's director of public affairs in the UK and an ex-member of M15, the military intelligence branch concerned with counterespionage and countersubversion in Britain.

Hargreaves thus has links with two of the organizations which cause the most public concern on the privacy front, critics of the DPC appointments have charged.

In addition, they pointed out, only two members have any involvement with data banks, and that primarily on a management level.

One industry observer commented that, with the current makeup of the DPC, "the Home Office got its own way. The members are all people to whom government pressure can be applied.

"I can't see *that* committee putting pressure on any government department, yet that is just what is needed," he added.

The only member of the DPC with a privacy background is Paul Sieghart, who was brought in from outside the govern-

(Continued on Page 4)

DG Shows Nova 3 Capable of Running Simultaneous Tasks

By Esther Surden
Of the CW Staff

SOUTHBORO, Mass. – Data General Corp. (DG) upwardly expanded its Nova 3 family last week with the introduction of the 3/D, a minicomputer which it said features a 32K-word MOS memory board and the ability to run dual operations.

Also introduced was the Dasher family of 30- and 60 char./sec terminal printers.

The Nova 3/D, which can support up to 128K words of memory, uses "fundamentally the same CPU" as the earlier Nova 3 models, a spokesman noted.

The system is compatible with Nova-line software and peripherals, he added, and application programs can be run on it

(Continued on Page 6)

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
TM Reg. U.S. Pat. Off.

EDITORIAL

Editor	E. Drake Lundell Jr.
Associate Editor/ Technical News	Ronald A. Frank
Associate Editor/ Software	Donald Leavitt
Computer Industry Editor	Molly Upton
Assistant Editor/ Miniworld	Esther H. Surden
Staff Writers	Catherine Arnst Nancy French John P. Hebert Edith Holmes Toni Wiseman
Chief Copy Editor	Cheryl M. Gelb
Copy Editors	Kathleen Quinn Bobbi C. Sternheim
Photography Editor	Ann Dooley
Editorial Cartoonist	Jim Orton
Bureaus:	
London	Roger R. Frampton
Munich	Dr. Gerhard Maurer
Asia	Hidetsuna Sasaki
Contributors:	
Education	J. Daniel Couger
Legal	Roy N. Freed
Taylor Reports	Alan Taylor
Contributing Editor	Edward J. Bride

SALES

National Sales Manager	Roy Einreinhofer
Advertising Administrator	Judy Milford
Display Advertising	Sara Steets
Classified Advertising	Pam Palmer
Recruitment Advertising	Abby Purrington
Sales Promotion Director	Jack Edmonston
Market Research	Kathryn V. Dinneen

CIRCULATION

Vice-President/ Circulation	Margaret Phelan
Assistant Manager	Barbara Jeannetti

PRODUCTION

Manager	Lee Vidmer
Supervisor	Henry Fling
Layout/Design	Cynthia L. Kintzer

Please address all correspondence to the appropriate department at 797 Washington Street, Newton, Mass. 02160. Phone: (617) 965-5800. Telex: 92-2529.

OTHER EDITORIAL OFFICES: England: Computerworld Publishing Ltd., 140-146 Camden Street, London NW1 9PF. Phone: (01) 485-2248/9; Telex: 264737. W. Germany: Computerworld, c/o Computerwoche GmbH, 8000 München 40, Tristanstrasse 11. Phone: 36-40-36/37. Telex: 5215350. Asia: Computerworld, c/o Dempa/Computerworld Company, Dempa Building, 1-11-15, Higashi Gotanda 1-chome, Shinagawa-ku, Tokyo 141. Phone: (03) 445-6101. Telex: 26792.

Second-class postage paid at Boston, Mass., and additional mailing offices. Published weekly (except: a single combined issue for the last week in December and the first week in January) by Computerworld, Inc., 797 Washington St., Newton, Mass. 02160.
© 1976 by Computerworld, Inc. All rights reserved.

50 cents a copy; $15 a year in the U.S.; $23 a year for Canada and PUAS; all other foreign, $40 a year. Four weeks notice required for change of address. Please allow six weeks for new subscription service to begin.

Reproduction of material appearing in *Computerworld* is strictly forbidden without written permission. Send all requests to Walter Boyd.

Computerworld can be purchased on 35mm microfilm in half-volumes (six-month periods) through University Microfilm, Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone: (313) 761-4700.

COMPUTERWORLD, INC.

Board Chairman/ Publisher	Patrick J. McGovern
President	W. Walter Boyd
Vice-President	Margaret Phelan
Consulting Editor	Dr. H.R.J. Grosch

ABP AIA

POSTMASTER: Send Form 3579 (Change of Address) to Computerworld Circulation Dept., 797 Washington St., Newton, Massachusetts 02160. ac

Proxmire Decries FCRA Limitations...

By Nancy French
Of the CW Staff

WASHINGTON, D.C. – The only law that comes close to protecting individual privacy in the consumer marketplace is the Fair Credit Reporting Act (FCRA) – and even this law is inadequate for today's world, Sen. William Proxmire (D-Wis.) told the Privacy Protection Study Commission at hearings conducted here last week.

The hearings, which culminated many months of examining recordkeeping practices in the private sector, focused on the firms whose product is personal information – the credit, investigative and commercial reporting companies.

"The activities or organizations engaged in consumer reporting cut across the entire fabric of American society," David Linowes, comission chairman, pointed out in his opening remarks.

"Virtually everyone who has applied for any type of credit, loan, life or automobile insurance, has been considered for certain types of employment or applied to rent an apartment has been the subject of a consumer report," he said.

Information recorded and communicated about an individual may range from minimum identifying data to the most intimate details of personal, physical and behavioral characteristics, Linowes added.

Privacy violations resulting from misuse of such sensitive information are compounded by the increasing computerization and centralization of these files and the matter bears careful scrutiny, according to Linowes.

No Prior Notice

Under present law, consumers receive no prior notification that reports will be prepared about them and only in the case of investigative reports – those that involve personal contact with friends and neighbors – is the consumer even told that a report has been or may be prepared, Proxmire told the commission.

Further, he said, present law requires that a consumer be advised of the identity of the reporting agency which supplied a report upon which he was denied credit, insurance or employment.

But denial of benefits or higher rates for those benefits are not the only adverse actions that a consumer report may precipitate, and the FCRA leaves those possibilities untouched, he said.

Earlier testimony before the commission showed "many life insurance companies make their decisions based on reports supplied by the Medical Information Bureau, even though that bureau's own bylaws prohibit such reliance. Here is one clear case where consumers are being affected by reports they may never know have been made," he said.

Further, although some are beginning to provide copies of files to consumers, the present law only requires agencies to disclose the "nature and substance" of that file, he said.

If the consumer wishes to challenge the information in his file, he may do so, but the reporting agency is not required to tell him of this right or of his right to file a written statement which must be included in subsequent reports, Proxmire added.

The senator also noted that under one of the compromises in the original FCRA, a consumer need not be told in advance of signing a credit or insurance application that such a report is being prepared.

The consumer may be notified three days later and, if he wants more details at that time, the report user must disclose only "the nature and scope of the investigation," he said.

Questions Asked

Among the questions asked by one of the largest investigative agencies for auto insurance investigations is: Is the applicant "active in any clubs or church groups or does he have any hobbies?"

It also asks about "criticism of home environment, associates, character or morals, parents or other members of the family, and how the applicant's spare time is spent," Proxmire said.

Finally, when medical information is to be gathered about a consumer in connection with an application for insurance, the consumer must sign an authorization form. This form is a blanket OK for any doctor or medical institution to release the consumer's medical history to the company, he said.

Shouldn't the consumer know that data may also be used in connection with reinsurance, job promotion or workman's compensation matters? Proxmire asked.

Shouldn't the consumer know that data may also be used in a case history for medical study in the training of physicians or to compile official reports to supervisory agencies, peer review or malpractice situations, or may be reviewed for death or disability claims? he added.

Nothing in the present law requires that individuals be told of these future uses or of the recording of their medical histories in the medical information bureau for use in connection with future insurance applications, Proxmire said.

"Businessmen need information about their customers in order to make sensible, sound decisions about credit, employment and insurance."

But, he indicated, it is equally clear that consumers are entitled to a measure of control over the collection and distribution of information about them.

"The fact that reporting agencies may 'own' [an individual's] physical report does not give them unqualified control over its contents or its use," he stated.

Wants Action Soon

Proxmire, who supports extending consumers' privacy protection which was "modestly" provided for by the FCRA of 1970, would like to see action in this area even before the commission makes its final report next year.

The Senate Banking, Housing and Urban Affairs Committee, which he chairs, has drafted and held hearings on a bill (S. 1840) that would amend that law. But chances are "slim" the bill will reach the Senate floor soon since a policy decision has been made not to take up anything "controversial" until January, he said.

Mandatory Consent Urged

Consumers should have to give their "informed consent" for the collection and distribution of information about themselves, he said.

Few consumers realize that in signing an application for insurance or employment they are consenting to a broad-ranging investigation of their character, morals and lifestyle.

"The individual should be able to know when that information has been used against him and by whom. Otherwise, we give approval to secret decision-making processes which the consumer is powerless to confront or change," he said.

The consumer is also entitled to know that information gathered about him is accurate, complete and relevant to the purposes for which it is used, Proxmire stated.

Further, the credit, insurance or job applicant "should not be subject to slipshod investigative techniques or haphazard data collection, distorted recording, reporting or evaluation methods.

"Finally, insurance actuaries ought to be made to justify their claimed 'need' for subjective and personal information," he added.

On the Inside This Week

NEWS

FCC Judge Rules AT&T Spin-Off Unwarranted 5
Problems Cited in Discontinuing SSN as Identifier 7
Societies/User Groups 8
Early Warning System Spots Trouble in N.J. Banks 11

EDITORIAL

Editorial: Shades of the Future 12
White Hat, Black Hat: Copyright 13
Taylor Report: Method Checks Deeds-Type Digits 13
System Designers Must Keep Walls From Tumbling 15
System Breakthroughs Can Become Breakdowns 16

SOFTWARE & SERVICES

Planning, Available 158 Eases DOS/VS-OS/VS Shift 17
'Profile' Locates Program Problems Without SMF Data ...18
'Son of Hipo' Proposed as Easier Charting Vehicle 21
DP Leaders Must Stop Fire Fighting, Start Managing 22

COMMUNICATIONS

Adoption of ADCCP Expected to Spark New Terminals ..23
Data Entry at Core of Retailer Inventory Service 24
DEC Unveils Interface Series 24

SYSTEMS & PERIPHERALS

Calspan Makes Fingerprint Matching a Hardware Job 25
Maintenance an Important Factor in the Used Market 25
Half-Duplex Interface Bows 26

MINIWORLD

Newspaper System Saving $628,000 29
Napacomp Turnkey Reduces, Analyzes Data 30
Lab's Increases Gathering of Test Data Tenfold 31

COMPUTER INDUSTRY

IBM Stinting Maintenance Mart: Vaughan 32
FTC Charges TRW, AM Violated Clayton Act 32
Cadapso Sees No Need for Government Intervention 35
CA Says Syfa Does Not Herald Abandonment of OEMs ..36
Hi-Line Settles Suit Against Singer, IMA 37

FINANCIAL

AT&T Expects 'Very Good' 1976 48
CSC Doubles Quarter Net 48

...But Credit Reporters See More Laws Harmful

By Nancy French
Of the CW Staff

WASHINGTON, D.C. – Further government efforts to restrict the use of personal information within the credit reporting industry would increase costs to credit reporting agencies and seriously reduce the individual's ability to obtain credit, the Privacy Protection Study Commission was told here last week.

These costs could also drive many small credit reporting agencies out of business and force small merchants to abandon private credit plans in favor of bank cards, credit bureau spokesmen said.

Rep. Jake Garn (R-Utah) supported their view, basing his opinion on "facts revealed during hearings" on proposals to strengthen the Fair Credit Reporting Act (FCRA) conducted by the Senate Banking, Housing and Urban Affairs Committee chaired by Sen. William Proxmire.

Garn, ranking minority member of that committee, articulated a view contrary to that of the committee chairman, who testified the day before.

"Often when Congress passes a law protecting the consumer it is actually denying the shopper free choice in the marketplace. The cumulative effect of these laws is killing individual initiative and stifling small business," he argued.

Garn urged the commission to answer the questions "who will benefit?" and "who will pay?" before supporting new consumer privacy protection legislation. The recent banking committee hearings showed Garn the FCRA "is working well," he said.

Consumer Complaints

While it was alleged that 20,000 consumer complaints had been received by the Federal Trade Commission since the FCRA went into effect, only 682 of these could be defined as actual valid complaints; less than 100 of these involved investigative, as opposed to consumer, credit reports and only 343 actual complaints were lodged against credit bureaus, Garn said.

Chief among the complaints cited were "relevancy and the actions taken by credit grantors in denying their applications," he said, adding one said consumers did not have access to information in their files and were therefore denied an opportunity to correct inaccurate information.

Credit industry spokesmen told the commission about a new voluntary program that permits individuals to examine hard copies of their files and even obtain copies to keep in some cases, going far beyond the requirements of the FCRA.

John L. Spafford, president of Associated Credit Bureaus, Inc. (ACB), said ACB's members pioneered this policy. ACB represents 1,800 small credit bureaus in cities with less than 20,000 inhabitants.

W. Lee Burge, president and chief executive officer of Equifax, Inc., formerly Retail Credit Corp., said his firm would begin the practice Oct. 1.

Spokesmen from all the credit bureaus represented at the hearings denied allowing government agencies and law enforcement agencies "unlimited access" to credit bureau file-type information.

Generally provided to enforcement agencies is "a lead" – name, address and employer, according to Spafford. Accordingly, it is against policy to obtain information from law enforcement agencies, the spokesman said.

Other Inquiries

As for other government inquiries, "less than 2% of the average credit bureau's annual volume is accounted for in regular reports to government agencies of all kinds," Spafford said. Nearly two-thirds of that 2% is for mortgage loan reports for the Federal Housing Authority or Veterans Administration, he added.

The other one-third of the 2% goes to various state agencies for granting jobs or professional licenses, which is a "permissible purpose" under the law, Spafford said.

The only legal way for a government agency to obtain credit bureau information not specifically covered in the permissible purposes provisions of the FCRA is through a subpoena issued by a court with proper jurisdiction. This would rule out the use of so-called "pocket" or "administrative" subpoenas, Spafford said.

Defining consumer credit reports as those containing simple factual information about an individual's credit history and investigating reports as those containing "more subjective" information, such as information on lifestyle, sexual preferences and health often gained from third parties, another spokesman for Equifax explained all data included in an investigative report must be confirmed by more than one source.

Information provided by a neighbor that cannot be confirmed, for example, is omitted from the client's report and no "raw notes" taken by investigators during interviews are retained. The individual then sees exactly what the client receives, he added.

While those appearing on behalf of the credit industry were opposed to new legislation, they conceded they could live with several key concepts suggested by the commission.

Among them is the concept that, while the reporting customer should be considered the "owner" of an individual's credit report, the individual should have a right to control its use much like the owner of a copyrighted document.

"One may own a book without having a right to copy and distribute it," Willis Ware, commission vice-chairman, pointed out.

Further, while testifying that they, not the credit grantor, should be the only ones to discuss a report with the individual about whom it was prepared, most agreed the explanation should be in the responsibility of the credit grantor when credit is declined for reasons other than material contained in the report.

After a general presentation by Spafford, Barry Connelly, another ACB spokesman, agreed to translate some of the numbers embodied in ACB's testimony.

ACB members, which produce 100 million credit reports annually, received two million requests for disclosures from the data subjects last year. Of that number, according to Connelly two-thirds, or 1,333,333, were requested after credit was denied, as permitted by the FCRA.

Of that number, 75,000 people inserted statements clarifying their side of disputes between themselves and merchants.

Manage COBOL with MetaCOBOL®

MetaCOBOL helps managers as much as it helps programmers.

As a management tool, MetaCOBOL assists in instituting effective and productive policies.

Want more conformity among programs? Establish impersonal standards control. Let MetaCOBOL, not your analysts, check programs for standards errors. MetaCOBOL can either correct items or write an in-line message.

Want better control of program quality? Use MetaCOBOL's testing and debugging procedures to establish a testing discipline — testing by objective with full management review capabilities.

Want to extend your investment in existing programs? Implement upward conversion using MetaCOBOL's conversion routines. Don't just convert . . . upgrade and improve.

Want structured programming? Only MetaCOBOL offers full structured programming in COBOL. Use MetaCOBOL's structured programming as the basis to institute top-down design and development.

Want better performance? Optimize by exception with MetaCOBOL. Choose programs which are expensive to run and let MetaCOBOL find the high-cost areas which should be changed.

Want more productivity? Set up resource pooling in which a library of in-house developed shorthand routines is used by your programmers to generate consistent and standardized COBOL code.

Want to be able to review project status? MetaCOBOL provides management review reports of file use, system activity, and program effectiveness.

Libraries of MetaCOBOL routines assist in many aspects of COBOL programming. The **Program Development Library** provides a convenient shorthand, and procedures for structured programming, report writing, and data base interface. The MetaCOBOL **Utility Library** adds routines for COBOL-TO-COBOL conversion, standards control, optimization, documentation, and system management. **Testing, debugging, and optimization extensions** speed project completion time and help assure program quality.

MetaCOBOL is used in over 300 installations worldwide. For more information contact any ADR office or mail the attached coupon.

APPLIED DATA RESEARCH, INC.
Software Products Division
Route 206 Center, Princeton, New Jersey 08540
Telephone (609) 924-9100

☐ Please send me information on MetaCOBOL

Name Title
Company
Address
City State Zip
Telephone

I am also interested in

☐ ROSCOE™ for on-line program development
☐ AUTOFLOW® II for maintenance and debugging
☐ The LIBRARIAN® for security and protection
☐ LOOK™ for real-time performance measurement
☐ PI SORT™ 2 for faster sorting

APPLIED DATA RESEARCH THE SOFTWARE BUILDERS®

ADR software products: in use at over 5,000 installations worldwide.

U.S. offices in Boston (617) 245-9540, Chicago (312) 694 2244, Cleveland (216) 228-0880, Houston (713) 526-3188, Los Angeles (213) 826-5527
New York (212) 986-4050, Pittsburgh (412) 885-2822, Princeton (609) 924-9100, Washington (703) 281-2011
Foreign offices in Australia, Austria, Belgium, Brazil, Canada, Denmark, England, Finland, France, Israel, Italy, Japan, Korea, Mexico, Netherlands,
New Zealand, Norway, Philippines, Puerto Rico, Republic of South Africa, Singapore, Spain, Sweden, Switzerland, Taiwan, Thailand, West Germany

FCC Inquiry to Probe DP, Communications Boundaries

(Continued from Page 1)

chine tool uses.

The proposed changes eliminate the hybrid service definition which said that services which were primarily communications-oriented but included incidental DP would be regulated and that services which were primarily DP-oriented but included incidental communications would be unregulated.

The proposed rules define CPUs as "general-purpose stored program processors, general- and special-purpose minicomputers and microcomputers." Processing would be defined as "the use of a computer for operations upon data which include arithmetic and logical operations, storage, retrieval and transfer.

These regulations "provide a demarcation between data processing services and communication services. By so defining data processing, we have deleted the 'hybrid service' concept and henceforth a service would be characterized as either data processing or communications," the commission said.

Explaining the FCC's logic behind the proposed rule changes, commission chairman Richard Wiley last week told attendees at the International Conference on Computer Communications in Toronto that "developments in distributed processing, switching and terminal equipment have put a severe strain on the definitions and rules that were laid down in the area of centralized data processing and electromechanical switching."

Wiley described the proposed definition as "a positive definition of data processing" in terms of "what it is rather than by exception, as we have done previously."

By sharply defining the regulatory boundary between DP and communications, technological and marketing developments will be stimulated by removing earlier ambiguities, he added.

In a related action, the FCC said it would call a future planning conference to consider the technological and policy aspects resulting from the convergence of computers and communications. Tentatively scheduled for September, the meeting will be open to the public.

Comments on the proposed rules are due by Oct. 11.

Users who send comments on the DP proposals should refer to "the adoption of proposed amendment to Section 64.702 of the commission's rules and regulations as set forth in Appendix A."

Paging Optimization Seminar.

Free.

Half-day seminar explains how to beat the high cost of excessive paging under VS. New software automatically improves paging as much as 91% thereby increasing throughput and decreasing turn around time. Learn the facts at local seminars. No cost to attend. Call today for reservation.

Date	Seminar Location
August 24	Washington, D.C. (301) 459-6880
August 25	Detroit (313) 569-3550
August 26	Kansas City (214) 634-8400
August 27	Houston (214) 634-8400

Boole & Babbage

Boole & Babbage, Inc.
850 Stewart Drive
Sunnyvale, California 94086
(408) 735-9550

Datapac Demonstrated at ICCC

(Continued from Page 1)

370/168 operating under VM/370 at Bell Northern Research in Ottawa. The CPU included an IBM 3705 front end modified with software to make it compatible with the X-25 packet-switching protocol adopted for use on the Datapac network.

The X-25 standard was implemented using the Standard Network Access Protocol (Snap), which is the Datapac version of X-25.

Various terminals were used in the demonstration, including CRTs and teleprinters. Also demonstrated were the Addressograph Multigraph Corp. Amcat credit authorization terminal and the NCR 280 point-of-sale transaction terminal.

The demonstration included an international interconnection with the French RCP experimental packet-switched network. RCP was described by French officials as the forerunner of the Transpac network that will begin serving French users in 1978.

The three operating RCP nodes in France were interconnected with a fourth node set up at the Toronto Datapac facility for the demonstration. The transatlantic link included a 9,600 bit/sec circuit split into dual 4,800 bit/sec data streams.

As part of the RCP demonstration node, an X-25 interface was programmed onto an Intel system that included an 8K 8080 microprocessor. A Digital Equipment Corp. PDP-11/35 was used as the node processor, according to the RCP representative.

The Datapac network was used to register ICCC attendees. About 1,000 attendees at the conference represented 23 countries, according to David Horton, director of computer communications planning with the Trans-Canada Telephone System, who was conference governor.

About 150 attendees were from foreign points off the North American continent, he said.

Privacy Unit Omits DP Experts

(Continued from Page 1)

ment to draft the white paper, "Computers and Privacy" [CW, Dec. 31-Jan. 5], which led to the committee's establishment.

Even the government-sponsored National Computing Centre was not represented in the 14 DPC appointments.

The committee was established to advise the government on the control machinery needed to ensure that existing and future systems holding personal information "are operated with appropriate safeguards."

It is also to evaluate "the objectives to be included in legislation" establishing permanent safeguards, according to the Home Secretary's announcement.

The British Computer Society (BCS) criticized the DPC's membership for its lack of technical expertise. The society is said to be "hopping mad" about the appointments.

The BCS is especially upset because the considerable assistance it offered in selecting the DPC membership was rejected. The society put forward the names of more than 25 people actively involved in computers and privacy, none of which were included on the DPC appointements.

This was all the more surprising because the government accepted a BCS offer to study the computer aspects of the controversial 1971 census and published the society's conclusions as an official government report.

The National Council for Civil Liberties (NCCL) has declared that "a majority of the committee consists of people professionally involved in collecting sensitive information about individuals. Only one of its members has a known history of concern for the individual's privacy."

The only DPC members with data bank involvements are Charles Reed, director of the Inter-Bank Research Organization, and Ken Potts, chief executive of Leeds City Council. Leeds is currently building a data bank of information on property and people. Known as Lamis, it is expected to be the basis of systems in several other cities.

In its evaluation of the DPC, NCCL said "it is hard to believe this committee will properly appreciate the urgent need to control the collection and use of confidential information. It is more likely to be obsessed with technical aspects of computer security and the cost of protecting privacy."

According to one insider, much of the DPC membership was selected from the civil servants' list known as "The Great and the Good" – those who have achieved eminence in something and are unlikely to offend the civil service.

The result, he said, is that the committee does not draw on any of the expertise built up in the past six years and will have to start from scratch all over again.

erisa

The Employee Retirement Income Security Act of 1974 effective January 1, 1976 mandates the recording of all hours worked and not worked, compensated and non-compensated, as well as all dollars affecting employee pension benefits.

Many payroll/personnel systems, including some recently installed, do not allow full compliance with ERISA.

If yours is included, you can find a quick remedy with a call to Joe Nestor at Wang Laboratories, Inc., Tewksbury, Massachusetts 01876, (617)851-4111 or in California call Carl Tarascio at (714)631-0138.

WANG

FCC Judge Rules AT&T Spin-Off Of Western Electric Unwarranted

By Toni Wiseman
Of the CW Staff

WASHINGTON, D.C. – A Federal Communications Commission (FCC) administrative law judge said last week that AT&T should not have to divest itself of its manufacturing subsidiary, Western Electric Co.

Judge David I. Kraushaar also found that AT&T's long-distance rates are reasonable in relation to its rate of return.

The rulings are part of an ongoing proceeding and came in the form of recommendations still to be considered by the FCC. They constitute a portion of Phase II of the FCC's hearings on AT&T charges and corporate structure begun in 1971 and will probably not be considered until early next year.

The judge's rulings balanced off previous FCC staff recommendations that AT&T be ordered to spin off Western Electric [CW, Feb. 9].

When the FCC began its investigation, it claimed the rate base on which the phone company bases its tariff charges is excessive and should be reduced.

In his opinion, Kraushaar said the "monumental record . . . in this proceeding fully justifies AT&T's continuing existence intact as a quality common carrier that provides excellent telephone service to a very large population."

The "integration" of Western Electric and Bell Laboratories in the Bell System "has provided, and continues to provide, definitive useful public benefits in the form of systemwide expertise and innovations that have, in turn, led to monumental technological advances," he added.

Although the FCC should upgrade its policing of AT&T's rate charges, "the problem of managing Bell's 'bigness' . . . simply doesn't call for the altogether extreme and revolutionary remedy of divestment and splinterization in the holy names of 'competition' and 'free markets,' " Kraushaar stated.

Rate of Return 'Reasonable'

Earlier this year the FCC decided AT&T is entitled to a return on its long-distance operates of 9.5% or up to 10% if the extra amount results from efficiencies. The previously authorized rate of return was 8.7%.

Kraushaar found that the over interstate revenue levels of AT&T's various operating companies in relation to overall interstate revenue requirements are "reasonable and capable of providing rates of return at reasonable levels" previously determined by the FCC.

Kraushaar also found AT&T's long-distance rates and charges are reasonable and just or at least not "unjust or unreasonable discrimination."

The order would also require AT&T to end all restrictions on sales of Western Electric equipment to non-Bell companies and to take steps to encourage Bell companies to buy equipment made by companies other than Western Electric.

Thomas S. Nurnberger, AT&T executive vice-president, said the company was "gratified" with the judge's findings, which he termed "sound."

AT&T has "always been convinced that the research and manufacturing capability built into the Bell organizations benefited telephone customers," he added.

In Boston . . . In Dallas . . . in Orange County, and in six other cities, OEM decision-makers meet the country's top computer and peripheral manufacturers at the Invitational Computer Conferences – the only seminar/displays designed specifically for the unique requirements of the quantity user.

In one day, at each 1976/77 ICC, guests will receive a concentrated, up-close view of the newest equipment and technology shaping our industry, presented by such companies as:

Amcomp, Braegen Corp, Calcomp, Computer Automation, Computer Operations. Control Data Corp., Data General, Dataram, Diablo, Digi-Data, Diva, EECO, Emerson Electric, General Automation, General Systems Int'l, General Instruments, Hewlett Packard, Houston Instruments, Interdata, ISS/Sperry Univac, Lear Siegler, MDB Systems, Microdata, Mohawk Data Sciences, Omron, PerSci, Pertec, Pioneer Magnetics, Printronix, Remex, Shugart Sykes Datatronics, Tally, Threshold Technology, Varian, and Wangco.

The Schedule for the 1976/77 Series Is.

September 8, 1976 Newton, Mass.
October 26, 1976 Chicago, Ill.
October 28, 1976 Minneapolis, Minn.
November 18, 1976 Dallas, Texas
January 18, 1977 Orange County, Calif.
February 14, 1977 Ft. Lauderdale, Fla.
March 15, 1977 Palo Alto, Calif.
April 26, 1977 Hempstead, L.I.
April 28, 1977 Philadelphia, Pa.

OEM AMERICA MEETS
at the Invitational Computer Conferences

icc

Invitations are available from participating companies or the ICC sponsor. For further information contact: B. J. Johnson & Associates, 2503 Eastbluff Drive, Newport Beach, Calif. 92660 (714) 644-6037.

ADABAS PERFORMS BETTER THAN ANY OTHER DBMS.

That's quite a claim...but that's what 12 independent surveys showed.

A Computerworld study says we're first in capabilities. Our performance also comes out on top in benchmarks by several major companies in a wide variety of industries. And we're rated first by state, county, and city governments.

Why does everyone like us so much? Maybe it's because of advantages like these:

1. With Adabas, you can cut your ongoing program maintenance by as much as 75%.

2. You can drastically reduce time and money needed to develop new applications.

3. You'll keep people on the job instead of in the class, because it takes just 3 days to learn Adabas.

4. You'll greatly increase your capabilities while reducing on-line storage requirements by an average of 25%.

5. You can get answers from your computer in seconds that used to take days. And you can supply more people with more answers than ever before.

To get all the facts about Adabas, fill out the coupon today or call (703) 860-5050.

By the way, we'll be glad to show you any or all of the surveys mentioned above. We perform better...and we can prove it!

software ag
OF NORTH AMERICA INC
Reston International Center, 11800 Sunrise Valley Drive,
Reston, Virginia 22091.

Name____________________
Company name____________________
Street____________________
City____________________
State____________ Zip________
Phone____________________
Type of computer____________________

C

CMI Reopens After Refinancing

BEDFORD, Mass. – Cambridge Memories, Inc. (CMI) has reached agreement in principle with its lending banks on a plan for additional funding.

The funding enabled CMI to resume operations on a reduced scale after closing down for more than a week because of financing problems [CW, Aug. 2].

CMI will sell its equipment now out on lease to an independent company in satisfaction of a debt of about $13 million owed to the lending banks.

The firm will have a contingent liability on the sale of up to $1.5 million on the leased equipment if the revenues from this equipment fail to achieve specified levels.

Nova 3/D Capable of Running Dual Operations

(Continued from Page 1)

without modification. The Nova 3/D runs under the firm's Real Time Disk Operating System.

Designed for the data entry and scientific user and for the small business user through systems houses, the 3/D is a "medium-scale mini," larger than Digital Equipment Corp.'s PDP-11/34 but smaller than the PDP-11/70, the spokesman noted.

The Memory Mapping and Protection Unit (MMPU), added to the Nova 3/D, is the hardware enhancement that allows concurrent batch and multiterminal operations. It performs logical-to-physical address translation, giving user programs access to 128K of memory through four address extension tables, or maps, including two program maps and two data channel maps, DG said.

Memory mapping and protection also permit privileged instructions, I/O device protection, main memory write and validity protection, the spokesman added.

The system can accommodate 700 nsec 16K-, 8K- and 4K-word semiconductor memories and 800 nsec 8K or 1,000 nsec 16K core memories as well as the 32K board.

The 700 nsec 32K memory, introduced for the Nova 3/D, can be used on all Novas. The DG-produced two-layer printed circuit board uses 4K random-access memory (RAM) chips.

An alternate board using Texas Instruments parts is also available, the firm noted.

Modular Terminals

The Dasher terminal printers, though introduced with the 3/D, were designed for use with all of the firm's minicomputers. The terminals, also made by DG, are modular with a "minimal parts count" for reliability, DG said.

The Dasher line consists of four models; both the 30 char./sec unit and the 60 char./sec model come in keyboard send/receive (KSR) and receive-only (RO) versions. All models print 132-column lines.

A single printed circuit board in the printer base contains all interface, control logic and encoder electronics, DG said. Modules for printhead/carriage drive, paper feed, ribbon drive and keyboard array can be easily accessed for service, the spokesman added.

The terminals, which can be used off-line as typewriters, feature a lead screw drive mechanism for the printers, he noted.

The terminals are interface-compatible with DG systems and character-compatible with Teletypes and other Ascii input devices, DG said, adding they can be interfaced to 20ma current loop and EIA RS-232C devices using asynchronous controllers or multiplexers.

The standard character set is 128 characters of upper and lower case Ascii. A 96-character European and an Asian character set are available and up to 29 function codes can be optionally added.

Users can field-select upper and lower case format or all upper case format, DG said.

Product Prices

A typical Nova 3/D configuration with 96K words of MOS memory with parity, MMPU, battery backup, memory parity control, power fail/auto restart, automatic program load, real-time clock, two 10M-byte disks, 300 line/min printer, 75 in./sec magnetic tape drive, 30 char./sec terminal printer and four CRTs costs $86,950.

The processor with 32K words of MOS with parity costs $14,400.

The Dasher Model 6042 30 char./sec KSR terminal costs $2,400; the 6043 RO version costs $2,200. The Model 6040 60 char./sec KSR terminal is priced at $2,650 while the Model 6041 RO unit costs $2,450.

FCC Policy Termed 'Conscious Flexibility'

(Continued from Page 1)

"We are allowing freedom of entry into the data transmission area by new carriers; that customers be allowed to have freedom to connect their own properly certified terminal equipment directly to the lines of established carriers; that entrepreneurs be able to lease basic transmission capacity from established carriers and to tailor that capacity to the specialized needs of their own customers.

"We are giving otherwide unaffiliated users the freedom to share private lines in order to take advantage of special rates or to gain network efficiencies; we are giving subscribers the option of using the international switched voice network for Dataphone service; and finally we are committed to giving the established carriers the freedom to compete fully and fairly in the specialized data communications areas," Wiley said.

'Reasoned Evolution'

Recent FCC decisions fostering competition represent a "reasoned evolution from past policies"; the competition that stems from these decisions is the result of phenomenal changes in electronic technology outside the control of the monopoly carriers and the dissatisfaction of specialized users with the regular services offered by these carriers, he said.

Commenting on the opposition to competitive policies by the established carriers, Wiley said "there is no evidence to suggest that rates for basic telephone service have been perceptibly impacted by the meager amount of competition introduced to date.

"And," he added, "there are adequate remedies available for dealing with any possible prospective adverse effects long before they could occur."

THE MATCHMAKER

Telefile introduces the only disk system flexible enough to match any minicomputer with any of the hot, new 3330-type drives. Big disk storage at a mini price.

Telefile now has available the most flexible large capacity disk system for minicomputers on the market today. The Matchmaker. It comes two ways:

As a disk system for users (DS-16-C) where we match your minicomputer with *any* of the latest 3330-type technology drives you want. Telefile supplies the complete package.

As an OEM disk controller. You can order just controllers alone (DC-16-C) and mix and match minicomputers and drives to satisfy your customer's whims and storage requirements.

Either way, disk system or controllers alone, you are assured of flexibility, performance features, and price no one else can match.

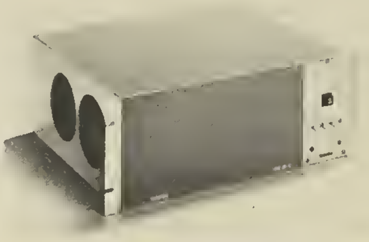
Each system stores up to 1.2 billion bytes.

You can match just the right drives to meet your storage capacity needs all the way from *13.3 million to 1.2 billion bytes per controller.* Each DC-16-C Matchmaker controller handles up to four drives. Minicomputers never had it so good.

Choose any of the latest drives.

You've seen them announced one-by-one and they're coming on strong. CalComp's Trident. Control Data's Storage Module. Diablo's 400 Series. The Ampex 9000's and Memorex 677's. Each builds upon IBM 3330 technology, which means higher storage densities and new circuitry for superior reliability.

To switch drives, simply change one controller circuit board. We've timed it at 63 seconds flat!



Compatible interfaces to eleven minicomputers.

We're designing a complete line of compatible interface boards to match up to many minis: Data General, DEC, Interdata, Keronix, D.C.C., Microdata, Honeywell, Lockheed, H-P, Varian, and Cincinnati Milacron. Simply fit our tailor-made computer interface module inside your computer chassis and you're in business. If you have another type mini, we'd be glad to design one for you.

Or you can design your own interface.

Your designers may want a piece of the action. Our general interface board makes it easy. Your board will tie in directly, bringing big disk storage to *any* 16-bit minicomputer.

A controller so small you can even hide it.

The Matchmaker is our smallest controller yet. It is totally self-contained right down to its power supply and cooling system. It's small enough to tuck away in a drive housing or in a rack above, below, or even *behind* the computer. Out of sight.

We'll even make you a faceplate.

If you want to show the Matchmaker off, we'll make a bezel to match your computer panel. Private label it and call it yours. There's no end to the flexibility.

Easy "front door" maintenance.

Five circuit boards slip right in from the front of the DC-16-C Matchmaker. A disk interface board, a general interface board, a command/timing board, a memory/address board, and an optional maintenance board for offline disk pack formatting and test exercising.

Unmatched features

- Contains 512-byte buffer for data rate matching
- Variable data search and read
- Block transfer of data up to mini-addressing capacity
- Offset positioning and data strobe controls
- Write protection to the sector level
- Sequential or staggered sector addressing
- Defective track relocation and alternate track addressing
- Overlapping seek capability
- Multi-sector operations across head and cylinder boundaries

We wrote the book on disk controllers, and you can get it free.

For years, we've helped minicomputer users grow their disk capacities. Now our Matchmaker system is a quantum leap forward. A new in-depth, hot-off-the-presses Matchmaker technical manual gives you all the facts. Write for it. Prove to yourself that this is one disk controller no one else can match.

Telefile
Turning minis into maxis with moxie

Please send me your Matchmaker book.
I'm interested ___now ___later (more than six months from now).
NAME________________
TITLE________________
PHONE________________
ORGANIZATION________________
ADDRESS________________
CITY________________
STATE________ZIP________
Telefile Computer Products, Inc.
17131 Daimler Street, Irvine, CA 92714
Free ph. (800) 854-3128, In Ca (714) 557-6660
Telex 68-5660 TELEFILE IRIN

Problems Cited in Discontinuing SSN as Identifier

By Nancy French
Of the CW Staff

WASHINGTON, D.C. – Discontinuing use of the Social Security number (SSN) as an identifier might prove more difficult for computerized record systems than the drafters of the Privacy Act of 1974 might have expected.

In a recent speech before local chapter members of the Association for Computing Machinery here, Samuel I. Schaen, coauthor of *The Privacy Act of 1974: A Reference Manual*, explained why.

Individuals are not required by law to remember or provide their specialized identification numbers, he said. Thus a cross-reference table based on personal characteristics is needed to identify individuals in record systems, Schaen said.

Second, to transfer information between systems, especially corrections, recordkeepers must be able to identify the same individual in more than one system of records, he said.

Cross-Referencing Problems

In the case of a cross-reference table for individual identification, the Office of Management and Budget (OMB) guidelines for implementation of the Privacy Act of 1974 suggested agencies use a combination of personal characteristics, such as date and place of birth, parentage and so forth, in addition to the individual's name.

This would be relatively simple in a manual system, but would require considerable character string manipulation in a computer system,. especially since names are not always precise, Schaen said.

"Individuals will often use shortened forms of their names so that 'Bill Jones,' 'William Jones' and 'William Jones Jr.' may, in fact, refer to the same individual.

"Likewise, a person's birthplace may also be subject to the multiname phenomenon," he said. For example, " 'Richmond,' 'Staten Island' and 'New York City' are all legitimate birthplace descriptions for individuals born on that borough/island which is part of New York City.

"With the exception of statistical records, each individual must have a unique identifier for that system to function" or there can be "no guarantee that information will be recorded accurately or be assigned to the proper individual" – another requirement of the act.

Functioning Problem

While it is possible to establish cross-reference tables of personal characteristics as an alternative to unique individual identification, many existing systems cannot function without the presentation of the unique individual identifier used to index the system.

Moreover, a generalized solution to this problem for automated systems could be very costly, he said.

Same Arguments Used Pro and Con

The arguments used to support the concept of a standard universal identifier are the same arguments made against it, he said.

The potential intersystem linking of individual records made possible by a standard universal identifier increase the potential of accumulating comprehensive data files on individuals.

Use of multiple identifiers increase the possibility of erroneous information being propagated uncontrollably or at least uncorrected, he said.

The choice, therefore, is between multiple unique identifiers and a standard universal identifier with other safeguards to prevent abuse.

While generating corrections is costly without a standard universal identifier, it is, nevertheless, possible to do, he said, noting that the objective is for the source agency to convey the identity of the individual in question to the previous data recipient.

The recipient agency, if it maintains a record on that individual, must, in turn, make the prescribed change in its record and then pass the correction along to any other agencies to which it had disclosed the record.

Identifier Eases Association

Certainly the association would be eased if a standard universal identifier were used by both systems, he said.

Agencies barred from using a standard numerical identifier might be inclined to standardize types and formats of the characteristics used, creating a de facto standard and thus defeating the spirit of the law.

A Possible Alternative

As a possible alternative, Schaen suggested the date, time and source of the original transfer of information be maintained by both agencies for use in matching a record.

"There is a very small probability an agency would disclose data for two identically named individuals at the same time," he said. Furthermore, the agency could take steps to assure that such a coincidence could never happen.

The only additional requirement placed on the recipient agency would be an acquisition log or some other indication of when the receipt of the original disclosure occurred. It is here that additional costs and complexity might prove prohibitive, Schaen suggested.

Russians Plan to Use DP To Seek Greener Pastures

MOSCOW – Russian shepherds will be able to determine the best feed routes for their flocks through the use of computers, according to Tass, the Soviet news agency.

Airplanes will provide photographic information about the ripening stages of grasses which the computers will process. The results will be communicated to the shepherds, Tass said.

SALE

DECWRITER II

PRINTER TERMINALS

Less than 5	$1650.00
5—9	$1600.00
10—49	$1500.00
50—100	$1450.00

This offer is good for 60 days.

CBC Services
170 E. Town St.
Columbus, Ohio 43215
(614) 461-5494

Why deal with a small computer company when there are so many big ones?

Never has enthusiasm for the small business computer been higher and never has the buyer's confidence been so uncertain.

What's happened? Manufacturers have left the computer business with losses in the multi-millions. Fear has spread and touched many solid companies.

The truth about today's computer market does not come from the headlines, from salesmen or "happy" customers. It comes from facts.

Strength is a fact.

Here at Qantel, profits have increased each month since July, 1975.

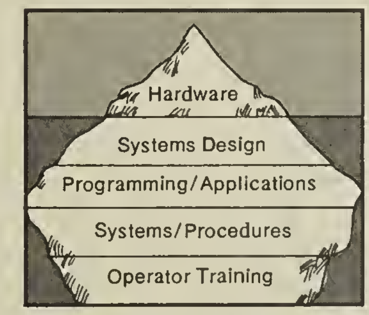
Bookings continue to increase. A broad base is being developed not only nation-wide, but in important international markets such as Australia, Europe and Mexico. Qantel will ship over 250 systems this year.

Qantel was founded in 1969, a pioneer in small business minicomputers. Now, three recessions, two stock market shifts and umpteen business ups and downs later, we're still here, growing stronger and looking to the future.

The real criteria.

If you're looking for a business computer to automate all your accounting procedures, the following points are not only vital to you but mandatory:

1. You must have a high level English-type programming language that your people can learn to use.
2. You must be able to add multiple operator terminals to do your different jobs simultaneously.
3. You must enjoy system expansion without language changes or reprogramming difficulties.
4. You must have ease of operation, quick training and a normal environment.
5. The system you buy today must be able to handle your next five years growth.
6. The system must have extensive packaged communications capabilities.



Beware the Cost Iceberg.

With a Qantel system, your first investment is your last. Because Qantel is a fully modular system, your investment in startup system design, programming, application and training is not jeopardized by future hardware upgrading.

Conduct your own private survey and see how far you can go with a small business computer system before you run into reprogramming or language problems.

Today Qantel lets you grow from one to 40 operators—all the way up to 640 million characters of data.

We've just introduced the new Series 1300—not just an extension of our line, but a system four times faster than earlier models. The Series 1300 is completely compatible with all existing Qantel hardware and software.

Listen to a computer for a change.

If you've read this far, you're hungry for information. We have an offer for you. Use our exclusive free information service. It's called The Configurator, and it tells you which Qantel computer can do the job best for you and all the hardware configurations to expect for the next five years.

Give us a call; drop us a line, or send the coupon. Once you read our material and check out our story, you might just discover a nice little company you'd like to do business with.

QANTEL
Moving up

Send to: **QANTEL Corporation
P.O. Box 3517
Hayward, California**

Please send me complete information on the free configurator printout.

NAME____________
COMPANY____________
ADDRESS____________
CITY____________
STATE________ ZIP______

Societies/ User Groups

Afips Elects Williams as President

MONTVALE, N.J. – The American Federation of Information Processing Societies (Afips) has elected as president Dr. Theodore J. Williams, professor of engineering and director of the Purdue Laboratory for Applied Industrial Control at Purdue University.

The Afips Board of Directors also reelected Dr. Albert S. Hoagland as vice-president, Dr. Sylvia Charp as secretary and Walter A. Johnson as treasurer. They assumed office July 1 and will serve for one year.

Williams, a past president of the Instrument Society of America, has served as secretary of the National Computer Conference Board and Chairman of the Afips Special Committee on Membership. He is currently chairman of Technical Committee TC-5, Computer Applications in Technology, for the International Federation for Information Processing.

He has authored or edited 10 books and published approximately 225 technical papers. Before joining Purdue, Williams was senior engineering supervisor in charge of computer control development at Monsanto Co. and visiting professor of automatic control at Washington University.

His B.S., M.S. and PhD degrees in chemical engineering were received at Pennsylvania State University and he also has an M.S. in electrical engineering from Ohio State University.

Lord Steps Down at SCDP

WASHINGTON, D.C. – Kenniston W. Lord Jr. has stepped down as president of the Society of Certified Data Processors (SCDP) and taking his place is G. Gary Casper, former vice-president of SCDP.

Lord decided to hand over the office so he would be free to concentrate on the society's Candidate Assistance Program (CAP), according to Wayne J. Smith, executive director.

Casper, who assumed office April 1, announced three goals he hoped to achieve during his tenure: an increase in membership, industry recognition of the Certificate in Data Processing (CDP) as a standard of acknowledged data processing proficiency and competency and the development of programs and materials that will enhance the value of the CDP.

Casper is a visiting professor of computer science at Brigham Young University.

Calendar

Aug. 16-18, Hershey, Pa. – **The Eight Annual Meeting of the National Association for State Information Systems (Nasis).** Contact: Carl Vorlander, Executive Director, Nasis, P.O. Box 11910, Lexington, Ky. 40511.

Aug. 18-20, Cupertino, Calif. – **Four Phase Users Association Annual Meeting.** Contact: Phil Shapiro, Allied Chemical Corp., P.O. Box 1039-R, Morristown, N.J. 07960.

Aug. 19-21, San Jose, Calif. – **Association of Field Service Managers Conference on Maintenance(AFSM).** Contact: AFSM National Meeting, P.O. Box 4853, Santa Clara, Calif. 95054.

Aug. 24-27, Waldenwoods, Mich. – **1976 International Conference on Parallel Processing,** sponsored by the IEEE Computer Society and the Association for Computing Machinery (ACM). Contact: Dr. Charles Elliott, Coordinator of Engineering Extension Programs, College of Engineering, Wayne State University, Detroit, Mich. 48202.

Aug. 27-Sept. 2, Atlanta – **Urban & Regional Information Systems Association (Urisa) Annual Meeting.** Contact: Ron Murch, Management Systems Development Department, City of Calgary, P.O. Box 2100, Calgary, Alta T2P 2M5, Canada.

Sept. 1-3, Chicago – **Annual National Electronics Conference and National Communications Forum,** to be held concurrently by the National Engineering Consortium, Inc. (NEC). Contact: NEC, Oak Brook Executive Plaza #1, Suite 103, 1301 W. 22nd St., Oak Brook, Ill. 60521.

Sept. 7-10, Washington, D.C. – **Compcon '76 Fall,** sponsored by the IEEE Computer Society. Contact: Compcon 76 Fall, P.O. Box 639, Silver Springs, Md. 20901.

Sept. 13-14, Chicago – **Metric Management Workshop,** sponsored by the American National Metric Council (ANMC). Contact: George Buchanan, ANMC, 1625 Massachusetts Ave., N.W., Washington, D.C. 20036.

Sept. 13-15, St. Louis – **Fifth Annual Retail Operations Seminar,** sponsored by the National Retail Merchants Association (NRMA). Contact: Operations Division, NRMA, 100 W. 31st St., New York, N.Y. 10001.

Sept. 14-17, Los Angeles – **Western Electronic Show and Convention (Wescon).** Contact: William C. Weber Jr., Wescon General Manager, 999 N. Sepulveda Blvd., El Segundo, Calif. 90245.

I'd like to find out more about Sycor's Cobol capability and other distributed data entry and processing equipment.
Send me information on:

☐ Sycor 440
☐ Sycor 410
☐ Sycor Cobol
☐ Other Sycor Systems

Name__________ Title__________

Company__________ Phone__________

Address__________

City__________ State__________ Zip__________

Computerworld

First Class
Permit No. 1531
Ann Arbor
Michigan

Business Reply Mail
No postage stamp necessary if mailed in the United States

Postage will be paid by

SYCOR
Corporate Offices
Ann Arbor, Michigan 48104

Attn: Marketing Services MS#1

After Three Collapsed Last Year

Early Warning System Spots Trouble in N.J. Banks

By Catherine Arnst
Of the CW Staff

TRENTON, N.J. – A computerized information system implemented here acts as an early warning device to spot troubled banks.

The system, which officials believe to be the only one of its type in this country, was set up in response to economic conditions that plagued New Jersey and in response to the precarious situation of some banks located here.

Within the past year, federal authorities have undertaken a probe into the collapse of three state-chartered banks and the workings of about 17 other banks.

Officials in the Department of Banking (DOB) hope the system will uncover problem areas in banks quickly so remedial action can be taken before a bank fails.

The proposal for the system was made in early 1975 by the DOB and programming began that spring within the Department of Transportation's DP center, which operates the system.

At the end of 1975, the system kept information on the 96 commercial banks and 20 savings banks in the state.

Twice yearly call reports, which are a statement of assets and liabilities, are submitted to the DOB and input into an IBM 370/145 along with earnings and dividends reports.

The computer then generates reports which contain information compiled from these sources of data. Parameters and ratios have been established within which a bank's performance must fall and each bank is compared to others within its peer group to measure its relative stability.

Prior to implementing the automated system, New Jersey compiled the reports needed by the DOB manually. This took approximately 62 man-hours to accomplish from the time call reports were filed. The DOB did not utilize earnings and dividends reports at all under the manual system.

"We didn't use the data then to find out if banks were in trouble. That wasn't noticed unless it hit us over the head while looking at the reports," according to Roger Wagner, deputy commissioner of the DOB.

Now reports are directed specifically to that area. When a bank is found to have a weak spot, that information is turned over to a bank examiner who visits the institution, Wagner said.

Major Hang-Up

"The major hang-up so far has been getting the call reports in quick enough," Frank Carr principal bank examiner, said.

However, reports were generated with the automated system two weeks after the last report was filed when it was first used in January, which Carr considers "a pretty significant breakthrough."

"With the automated system we have not only increased our input and the amount of output, but have decreased our lead-time," he said.

The DOB designed the system, which was programmed in Fortran by the Department of Transportation. Various outside packages were examined, including a Federal Deposit Insurance Corp. (FDIC) model, but "we decided to go our own route," Wagner said. "And we got off the ground very quickly."

Programming was started in April 1975 and the first test run was done in August. In January, the system was officially put into operation compiling the call reports filed at the end of the year.

Test, production and operation costs total about $1,200 per filing, which is done twice a year, Carr said.

More Data Wanted

A $12,000 modification in the program has been proposed because the FDIC has changed the format of the call report and the program must be changed to accommodate it. With the new program, the DOB has asked that more statistics on individual banks be compiled.

"We are going to try for more sophisticated information all the time," Wagner said. "The key to a successful system is recognizing what data is needed."

The reports generated by the system are not made public although all the call, earnings and dividend reports are available to anyone, Wagner said.

New Jersey wanted an early warning system because it had more than the usual amount of economic problems, Wagner claimed. During the recession, loan classifications had increased more than 100% for two years in a row, he said.

Only one distributed processing system speaks Cobol. Sycor's.

Now your branch offices can use Cobol, the language of maxi-computers, with Sycor's 440 and 410 distributed data entry and processing systems.

That means you can do many vital jobs such as report generation, file listings, post data entry editing and file maintenance faster than ever before. Because they're done at the source, instead of on your large, central computer. And Sycor's Cobol capability is available at no extra cost.

With Sycor's Cobol, a subset of ANSI '74 Cobol, you can still have central control by doing all your program development on your host computer. Or test your programs and do compiling on a 440 or 410 in your branch locations.

Flexible Sycor systems increase efficiency.

While Cobol is running as a background task, your data entry operators can be keying multiple applications in the foreground. All on Sycor 440 and 410 systems.

The Sycor 440 is available with 5, 10 or 20 million characters of storage, 64k bytes of memory and up to eight video display terminals for your large regional offices.

A variety of peripheral options helps stretch your data processing dollar, too. Options like five speeds of printers, three magnetic tape drives and a card reader. Plus asynchronous and binary synchronous communications.

Put economical Cobol at smaller branches.

The Model 410 gives you the same big Cobol processing power as the 440 system for your smaller branches, at a stand-alone-terminal price.

For $516 a month on a three-year lease, the 410 provides 2.5 million characters of disk storage, 40k bytes of memory, a display station, communications and a 60-cps bidirectional printer. And fast, reliable maintenance from one of our 100 nearby service centers in the United States and Canada.

Get the whole story on Sycor and Cobol.

Find out how you can put big-computer power in your branch offices by using Sycor distributed data entry and processing equipment. Send in the reply card or write Ken Wilson, our product manager, Sycor, Inc., Corporate Offices, Ann Arbor, MI 48104. Or call him at (313) 995-1371.

Better yet, call one of our 32 conveniently located sales offices. They're in the Yellow Pages under "Data Processing Equipment."

Sycor puts computer power where the work is.

SYCOR

Editorials

Shades of the Future

The great IBM antitrust trial being held in New York City has taken a major step toward being held in an empty arena. The latest to abandon the scene is no other than Judge David N. Edelstein [CW, Aug. 2].

So attorneys for both sides appear each day and seem lost in the massive courtroom in Foley Square. Perhaps that is fitting, for many believe this trial is being forgotten in a society that prefers to deal with problems of the present rather than motivations of the past.

We can foresee some technical/electronic refinements in this case as it progresses, however. After the judge has adequately demonstrated that things can proceed smoothly without his presence, why not eliminate the litigants?

About six months from now, we can see the stage lights softly lit at the Foley Square courtroom. A cleaning person is silently sweeping the floor. In the front of the courtroom near the witness box, an IBM 3 equipped with a new audio interrogation/response feature is "questioning" a minicomputer/tape recorder system representing a government witness.

On the government side rests another mainframe that looks very much like a 370, but has been camouflaged with paint.

At regular intervals, the court clerk comes in to put a new spool of tape on the multidrive subsystem that has replaced the judge's chair.

Another clerk is conferring with an IBM 3 diagnostic expert. It seems the witness system has raised objections. The IBM CPU is creating electronic interference which is interrupting the logic commands being entered into the witness system by a government attorney at a remote terminal.

One feature has been added over the judge's bench. A huge counter now updates the ever-increasing cost of the trial in real time.

Other than that, little has changed and the trial drones on.

OS Users May Need Help

IBM's plan to drop support of OS/MFT and MVT to Class C [CW, July 5] had been expected by most of us for some time and shouldn't have been a shock to any user. There was no reasonable way in which IBM could continue support for the 360-oriented operating system indefinitely.

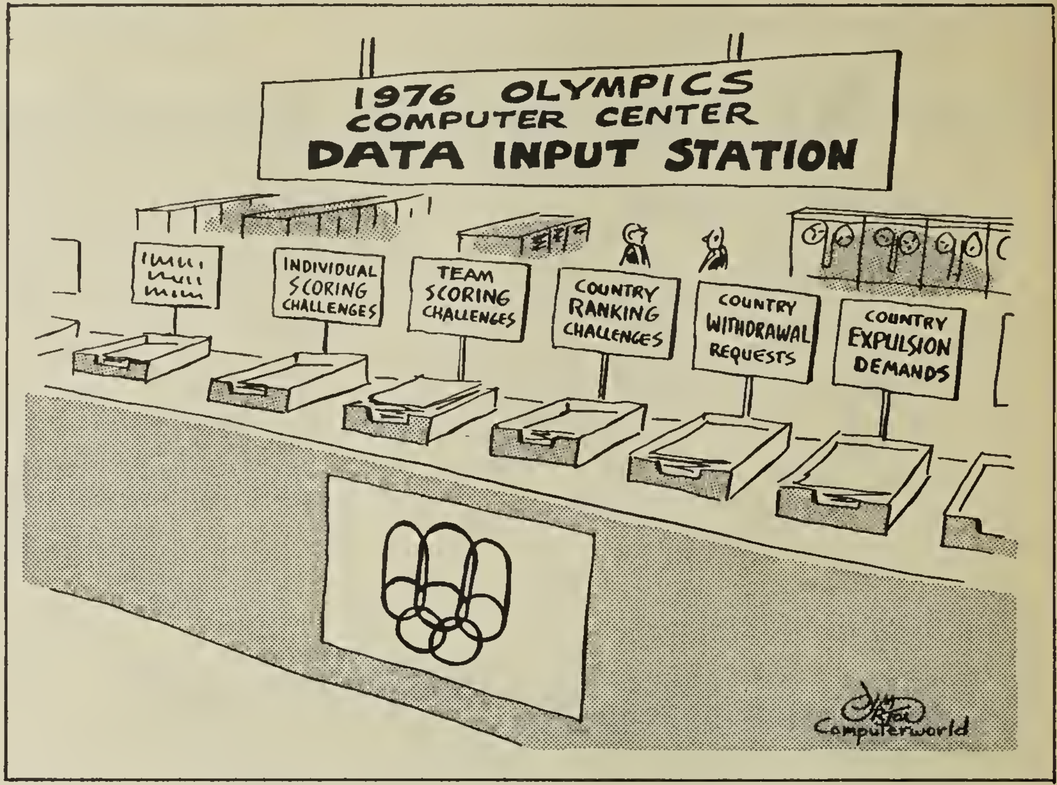
Ever since DOS/360 was effectively abandoned three years ago, users have been urging IBM to give them at least a year's warning before it cast them adrift. Now that the cutoff date has been set – and it's substantially more than a year from now for Release 21.8 – it's up to the users to prepare for the future.

Certainly, the Guide and Share user groups will continue to be supportive of their members.

Beyond that, there haven't been as many software packages to enhance OS as there were – and still are – to improve DOS. But the vendors and packages that are available may provide some help.

When DOS went to Class C, the Computer Lessors Association (CLA) set up a DOS Support Service for clients of the companies that make up that group. On the face of it, such dedicated support would seem to be unneeded by OS shops, which are typically larger and more sophisticated than their DOS cousins. And yet, there obviously will continue to be installations growing out of DOS and seeking something other than VS as their next step.

Perhaps now is the time for CLA or the software vendors involved with OS packages to take a look at how they can best help the user.


1976 OLYMPICS
COMPUTER CENTER
DATA INPUT STATION
INDIVIDUAL SCORING CHALLENGES
TEAM SCORING CHALLENGES
COUNTRY RANKING CHALLENGES
COUNTRY WITHDRAWAL REQUESTS
COUNTRY EXPULSION DEMANDS
Computerworld

Letters to the Editor

Dataproducts Expects Increase, Not Decline in Core Memory Sales

The article on Dataproducts in the July 12 issue of *Computerworld* stated that Dataproducts was phasing out of the core memory business.

I was interviewed for the information in the article, and our direction in the core memory business was misunderstood. Dataproducts is not phasing out of this business; in fact, this year will be a growth year for core memories in both revenues and profits.

The headline "Dataproducts Concentrating on Printers" was correct. Over 70% of our revenues are derived from line printers.

Last fiscal year, we did have a decline of core memory revenues to $13.5 million which was primarily due to recessionary pressures. A decline in revenues for one year does not mean a phaseout. We expect this year to be as good as any we have had in the past.

The predictions by many industry forecasters over the past few years that core memories were no longer going to be used are not true. The expected revenue increase by Dataproducts this year is because of our market concentration in areas where core memories have distinct advantages over semiconductor memories.

Dataproducts has always enjoyed a profitable position in the core memory business. We expect to remain profitable, and have made resource commitments to keep our dominant position in the marketplace.

Irving L. Wieselman
Vice-President, Product Programs
Dataproducts Corp.
Woodland Hills, Calif.

Data Past

Five Years Ago
Aug. 11, 1971

CHICAGO – One thousand attendees turned out for the 25th birthday of the computer at ACM '71 here. Association members wanted the Association for Computing Machinery (ACM) to spend less time on technology and more time on improving both the quality of information handling within the industry and the image of the industry and the computer outside the DP community.

– – –

MINNEAPOLIS – Control Data Corp. introduced its 921 optical character reader which used a helium-neon laser to drive the system. The device read at a speed of 1,200 document/min and cost $24,000 or $1,865/mo on a one-year lease.

Eight Years Ago
Aug. 7, 1968

WASHINGTON, D.C. – The telephone foreign attachments tariff remained in effect for another month because of a Federal Communications Commission (FCC) ruling that granted AT&T consideration of its appeal of the FCC decision to void the tariff. The tariff prohibited connection or attachment of equipment or devices to the public telephone system not authorized by the telephone companies.

– – –

WASHINGTON, D.C. – Three telephone companies entered the time-sharing services business while the FCC studied suggestions that the common carriers as a whole be prohibited from offering DP services. United Computing Systems, General Telephone & Electronics and ITT Data Services received a strong reaction from service bureaus because of alleged "advantageous position," the service bureaus said.

Grosch's Humor Lacks Punch

Like other intellectuals turned humorist, Herb Grosch suffers from the literary weakness that some of his attempts at humor confuse too many of us: we don't get the joke. An example was his July 19 column in which he seemed to be suborning the American Federation of Information Processing Societies (Afips) and its member societies, especially the Association for Computing Machinery (ACM), to fakery. It wasn't until third reading that I realized he must be pulling my leg.

He suggested that "without attempting to get broad membership concurrence, the associations . . . forward positions to Afips . . . which picks testifiers for hearings and puts out a Heavy Press Release describing the submission as 'consensus of . . . societies' . . . The idea is to slide the papers upstairs quickly and quietly."

Grosch had to be kidding. Surely he knows that on most controversial subjects, certainly the issue of data communications policy, there can be no clear ACM consensus: most of us individual members who would be affected are ignorant of the substantive facts and diverse enough in our goals so that any meaningful "position" has to be that of a minority. The societies' and Afips' tax positions are well-protected by those realities.

Afips and its member societies might well get in trouble by attempting to influence legislation, particularly if some spokesman puts his foot in everyone's mouth by pretending consensus where none exists. Grosch's column itself ensured such nonsense would/should be instantly recognized and ignored or challenged.

This column was one more sympton of Grosch's itch to change the technical societies into what he calls "trade guilds," or what most of us call trade associations. He should not read his election as ACM president to be a mandate for that kind of change.

Herbert S. Bright
Bethesda, Md.

Copyright

We're in the middle of another cycle of the recurring discussion of patents and copyrights and trade secrets and registry of ideas. Every person in the computer business is affected, from the student who pays an exorbitant price for his textbook to the retiree who Xeroxes articles from *Computerworld.* There is an off-again, on-again, away-again series of decisions on software patentability. There is a vigorous recalcitrant movement among computer hobbyists, proud of its program piracies. And in the background, ominously threatening the stability of the hot-lead-and-printers-ink trades themselves, and their age-old products, is the generation of large amounts of information on evanescent media like TV screens, terminal CRTs, digital wristwatch faces, and the like.

I myself believe that the handiness, the relative permanence, the transferability, the authority of hard copy will preserve its use indefinitely. There will always be the sexy brochure, the detailed operating manual, the carefully typed legal contract, the airport rack of paperbacks. But there will be — has already been — a fantastic growth in new ways of transferring data.

Look at what we have: phonograph records, audio tapes, cartridges, cassettes, and computer-generated audio response; punched cards of many sizes and shapes, and paper, plastic and foil tapes of many formats; automatic typewriters, I/O and free-standing line printers, teletypes, consoles and terminals; black-and-white and color CRT displays; cylinder and flatbed plotters; COM devices of a dozen provenances; even computer Braille!

And copying devices, from ten-dollar hectographs and supermarket coin-in-the-slot copiers to room-sized monsters with choppers and bursters and decollators and collators: not only to copy locally, but to copy from originals a satellite-link away.

Let me run through one or two major dilemmas, beyond the obvious rip-offs we all recognize. Take the college professor: torn, he is! On the one hand, he writes textbooks and scholarly material, and receives sometimes rather substantial royalties. On the other, he and his students benefit enormously from easy access to other people's material, and especially from inexpensive copying; from ghetto dweller to ARPANET member, access makes life richer.

And another case, pointed out first by Calvin Mooers: IBM puts out a copyrighted manual describing either the hardware-level instruction code of a new machine, or the higher-level language and operating system. This manual clearly states it is to be used to help customers, paying customers, write programs to run on the machine concerned. Now an RCA or an Amdahl uses that manual to design a competitive machine which accepts customer programs — IBM-compatible, we usually say — and competes successfully for hundreds of millions of dollars worth of IBM business. Is that "fair use"?

All of this, and much more besides, is being hashed over again in Washington. I'm deeply interested. But I don't see any simplistic solutions; the problems of protecting proprietary software is so remote from the problem of whether CRT display of data violates copyright, and so on, and so on, that I believe an enormous, compendious, easily amended omnibus bill may be necessary.

When I was in the Department of Commerce I recommended the following subpolicy to Senate committee counsel: copyrighted material could be entered without hindrance into temporary or permanent computer storage; it could be processed, substantially augmented or edited or reduced, and then output in any form without hindrance; it could be output for study and use (as, for instance, to choose alternate computer operating strategies without hindrance on transitory media such as cathode ray screens or regularly-destroyed console printouts, even in substantially unaltered form; on the other hand, to output sizable quantities of full text in permanent form, humanly readable — hard copy, we say — regardless of where the output appeared, would be a violation.

Wasn't much of a contribution, and in fact the recommendation was undoubtedly minced up in the great legislative grinder that operates on the Hill. My point is, dozens and dozens of such policy facets, reworded and circumscribed by pages of legalese, have to be adopted before a rational approach to copyright (let alone patent) rights in our age of modern technologies can be promulgated. Moreover, some mechanism to easily amend the law as new information capabilities flourish is vitally needed.

Finally, something like the social/economic device used to compensate composers and musical artists for commercial performance of their works will almost certainly have to be proposed and refined for our trade, and especially software. If every package could be tracked, and every use recorded, like every playing of Elvis' "Blue Suede Shoes," we'd have a new ball game indeed.

Herb Grosch

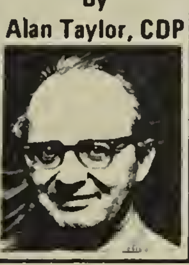
Graphical Method Checks Deeds-Type Check Digits

Check digits, except for the simple versions, are not easy to check. In production there are normally computers all set up to handle it, but during development of new systems there is an advantage in being able to know whether a check digit is correct quickly and accurately.

The Taylor Report

By

Alan Taylor, CDP



H. Block and A. Skough of the Swedish National Bureau of Statistics recently published some original work on this subject. Personally I am very grateful to them, because they not only caught an error in the Oct. 22 Taylor Report on the Deeds method, but also calculated a new table which permits the checking to be handled and demonstrated as easily as the original coding can be performed.

This table, which has the columns as inverse permutations of the rows of the reduction table of the Deeds method, appears on Page 4 of the report.

However, Block and Skough then went much further. They developed and illustrated a graphical method for checking the accuracy of the check digits of any of the Deeds type of check digits, which is something I had not realized could be performed.

The method uses nine tables for any particular basic permutation.

For example, one of the permutations they have studied (in place of the original Deeds number of 0496183275) is 0915243678. The tables this permutation gives rise to are shown in Figure 1.

These are used by starting with the original number, least significant end, in a single permutation called the START. Looking at the table to the right, find the tens digit of the number to be checked in the same row as the original units number. Now, turn Downwards and find the hundreds digit in the next table in the same column as the tens digit.

Repeat this process of matching the digit in each decimal place with a digit in each table moving from table to table at 90-degree angles.

For a number with more than 10 digits, reenter the tables to the right of the start block at the column with the same digit as the number under the last table in the same column as the decimal place digit.

The check digit will be found under the table in the same column as the last decimal place digit.

This really is a very simple method — easier to do than to describe. It can handle any length of number, can be used by anybody and requires no computer — not even a pencil and paper.

There is a lot more the Stockholm people are doing, upon which I will shortly be commenting. But this checking method is really worth looking at in detail. Try it for yourself.

© Copyright 1976 Alan Taylor. Reproduction for commercial purposes requires written permission. Limited numbers of copies for non-commercial purposes may be made provided they carry this copyright notice. The views expressed in this column do not necessarily reflect those of *Computerworld*.

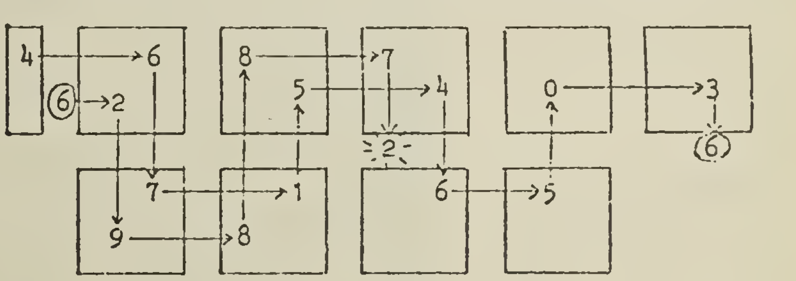
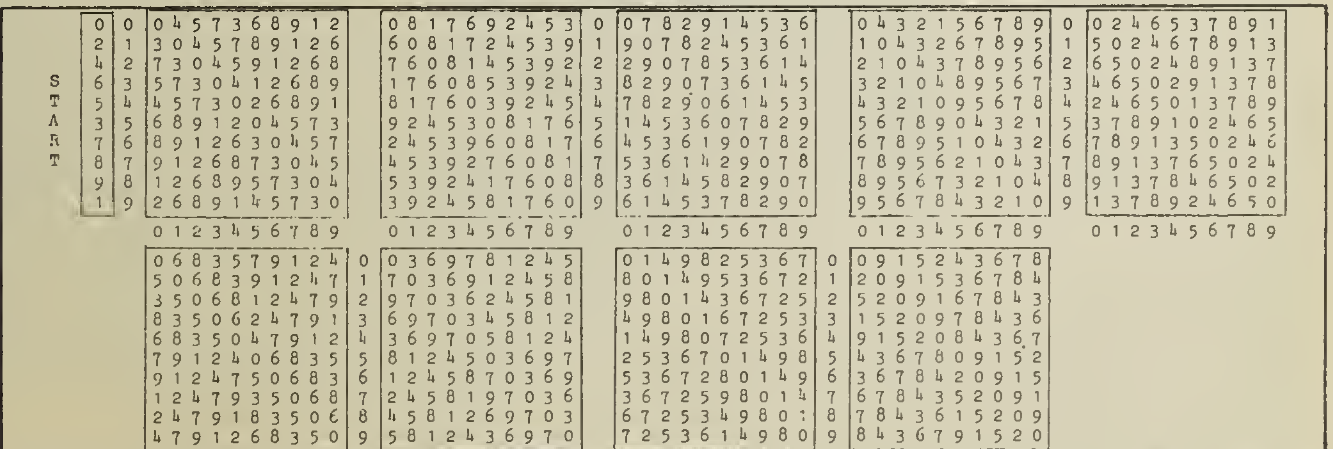


Figure 2. The tables are used by going through the number as illustrated above for the number 788923056451764, from the least significant decimal place. Basically, one turns 90 degrees for every digit in the number, and under the last row or column number the check digit is found.



	START
0	0
1	2
2	4
3	6
4	5
5	3
6	7
7	8
8	9
9	1

	0	1	2	3	4	5	6	7	8	9
0	0	4	5	7	3	6	8	9	1	2
1	3	0	4	5	7	8	9	1	2	6
2	7	3	0	4	5	9	1	2	6	8
3	5	7	3	0	4	1	2	6	8	9
4	4	5	7	3	0	2	6	8	9	1
5	6	8	9	1	2	0	4	5	7	3
6	8	9	1	2	6	3	0	4	5	7
7	9	1	2	6	8	7	3	0	4	5
8	1	2	6	8	9	5	7	3	0	4
9	2	6	8	9	1	4	5	7	3	0

	0	1	2	3	4	5	6	7	8	9
0	0	8	1	7	6	9	2	4	5	3
1	6	0	8	1	7	2	4	5	3	9
2	7	6	0	8	1	4	5	3	9	2
3	1	7	6	0	8	5	3	9	2	4
4	8	1	7	6	0	3	9	2	4	5
5	9	2	4	5	3	0	8	1	7	6
6	2	4	5	3	9	6	0	8	1	7
7	4	5	3	9	2	7	6	0	8	1
8	5	3	9	2	4	1	7	6	0	8
9	3	9	2	4	5	8	1	7	6	0

	0	1	2	3	4	5	6	7	8	9
0	0	7	8	2	9	1	4	5	3	6
1	9	0	7	8	2	4	5	3	6	1
2	2	9	0	7	8	5	3	6	1	4
3	8	2	9	0	7	3	6	1	4	5
4	7	8	2	9	0	6	1	4	5	3
5	1	4	5	3	6	0	7	8	2	9
6	4	5	3	6	1	9	0	7	8	2
7	5	3	6	1	4	2	9	0	7	8
8	3	6	1	4	5	8	2	9	0	7
9	6	1	4	5	3	7	8	2	9	0

	0	1	2	3	4	5	6	7	8	9
0	0	4	3	2	1	5	6	7	8	9
1	1	0	4	3	2	6	7	8	9	5
2	2	1	0	4	3	7	8	9	5	6
3	3	2	1	0	4	8	9	5	6	7
4	4	3	2	1	0	9	5	6	7	8
5	5	6	7	8	9	0	4	3	2	1
6	6	7	8	9	5	1	0	4	3	2
7	7	8	9	5	6	2	1	0	4	3
8	8	9	5	6	7	3	2	1	0	4
9	9	5	6	7	8	4	3	2	1	0

	0	1	2	3	4	5	6	7	8	9
0	0	2	4	6	5	3	7	8	9	1
1	5	0	2	4	6	7	8	9	1	3
2	6	5	0	2	4	8	9	1	3	7
3	4	6	5	0	2	9	1	3	7	8
4	2	4	6	5	0	1	3	7	8	9
5	3	7	8	9	1	0	2	4	6	5
6	7	8	9	1	3	5	0	2	4	6
7	8	9	1	3	7	6	5	0	2	4
8	9	1	3	7	8	4	6	5	0	2
9	1	3	7	8	9	2	4	6	5	0

	0	1	2	3	4	5	6	7	8	9
0	0	6	8	3	5	7	9	1	2	4
1	5	0	6	8	3	9	1	2	4	7
2	3	5	0	6	8	1	2	4	7	9
3	8	3	5	0	6	2	4	7	9	1
4	6	8	3	5	0	4	7	9	1	2
5	7	9	1	2	4	0	6	8	3	5
6	9	1	2	4	7	5	0	6	8	3
7	1	2	4	7	9	3	5	0	6	8
8	2	4	7	9	1	8	3	5	0	6
9	4	7	9	1	2	6	8	3	5	0

	0	1	2	3	4	5	6	7	8	9
0	0	3	6	9	7	8	1	2	4	5
1	7	0	3	6	9	1	2	4	5	8
2	9	7	0	3	6	2	4	5	8	1
3	6	9	7	0	3	4	5	8	1	2
4	3	6	9	7	0	5	8	1	2	4
5	8	1	2	4	5	0	3	6	9	7
6	1	2	4	5	8	7	0	3	6	9
7	2	4	5	8	1	9	7	0	3	6
8	4	5	8	1	2	6	9	7	0	3
9	5	8	1	2	4	3	6	9	7	0

	0	1	2	3	4	5	6	7	8	9
0	0	1	4	9	8	2	5	3	6	7
1	8	0	1	4	9	5	3	6	7	2
2	9	8	0	1	4	3	6	7	2	5
3	4	9	8	0	1	6	7	2	5	3
4	1	4	9	8	0	7	2	5	3	6
5	2	5	3	6	7	0	1	4	9	8
6	5	3	6	7	2	8	0	1	4	9
7	3	6	7	2	5	9	8	0	1	4
8	6	7	2	5	3	4	9	8	0	1
9	7	2	5	3	6	1	4	9	8	0

	0	1	2	3	4	5	6	7	8	9
0	0	9	1	5	2	4	3	6	7	8
1	2	0	9	1	5	3	6	7	8	4
2	5	2	0	9	1	6	7	8	4	3
3	1	5	2	0	9	7	8	4	3	6
4	9	1	5	2	0	8	4	3	6	7
5	4	3	6	7	8	0	9	1	5	2
6	3	6	7	8	4	2	0	9	1	5
7	6	7	8	4	3	5	2	0	9	1
8	7	8	4	3	6	1	5	2	0	9
9	8	4	3	6	7	9	1	5	2	0

Figure 1. The START block and the nine matrices shown are all anyone needs to check the accuracy of Deeds-type check digits. These are set up for 0,9,1,5,2,4,3,6,7,8.

Letters to the Editor

Mark III Predates ADR Product 'First'

I have some comments on the article regarding Applied Data Research, Inc.'s (ADR) "firsts."

Informatics, Inc. began marketing its Mark I system in 1962. The system was described in a *Datamation* article of December of that year. This predates the ADR activity by three years.

International marketing of Informatics' Mark III system began in 1964, thus predating ADR's international activity by two years.

Sale of Informatics' Mark IV system alone, not to mention our Intercomm, Score, Life-Comm and other products, exceeded $30 million dollars by 1974, thereby predating ADR in that department by one year.

Informatics supports, maintains and improves its products on a regular basis, in the course of which we maintain a continuing relationship with all of our product users. Thus, ADR's program to do so is by no means unique.

John A. Postley
Senior Vice-President
Informatics
Woodland Hills, Calif.

'Dumb Westinghouse'

Regarding Herb Grosch's column, "Gerhard Neumann" [CW, July 5], "just dumb Westinghouse's" Nuclear Center has the world's largest commercial computer center, run by computer professionals.

Joel W. Williamson
Pittsburgh, Pa.

Authors Named

A column by Herb Grosch suggested programmers put their names on programs [CW, April 19].

Grosch might be pleased to know that International Mathematical & Statistical Libraries, Inc., which distributes a library of over 300 routines to do mathematical and statistical computations, has done just this for over two years. Each routine bears the name of the person(s) responsible.

John Bolstad
Stanford, Calif.

GE Really Has Net

The headline on the July 19 letter to the editor "GE to Expand Also" gave me the impression *Computerworld* still didn't quite believe General Electric (GE) had a network.

GE has had a time-sharing network in Europe, Canada and the continental U.S. since 1969 and is the acknowledged pioneer in this regard.

MK 111 now services Japan, Australia, Singapore and all of western Europe from Scandinavia to Spain, Italy, Ireland and points between. All this, with the exception of Singapore, has been in place for several years.

Steve Salter
Pasadena, Calif.

DP Only a Tool

I agree with the conclusions in the editorial, "Learning the Hard Way" [CW, May 24], that drastic action must take place before bureaucrats will change anything and that too much information can be as dangerous as too little information.

But I don't extend this just to bureaucrats. This applies to *all!*

Let's remember that computers are only tools that assist people in accomplishing the required work.

Kenneth Erickson
Robbinsdale, Minn.

Former Clients Served

The article on point-of-sale (POS) system vendors in the July 12 edition of *Computerworld* was highly interesting to us as our firm has just begun a Retail Service Operation polling POS terminals.

However, I do take issue with the statement regarding the former customers of Androcor Division of Boeing Computer Services which CW reported were picked up by Service Bureau Corp. (SBC).

To my knowledge SBC was successful in obtaining only one of the former Androcor clients and we got the rest. These are all operational with us now whereas SBC is still converting the one client.

James A. Gross
President
Computer Associates, Inc.
South Bend, Ind.

Protecting the Guilty

Alan Schlustmeyer's letter [CW, May 24] berated John Kannarr's stand on "earned" data [CW, May 10]. When an individual defaults on a loan (Kannarr's example) or chronically writes checks for which there are insufficient funds on deposit that individual has indeed had benefit of trial – a trial in which he has, unassisted, convicted himself of financial irresponsibility!

Schlutsmeyer's "fundamental concept: due process" when it *really* works, does not protect everyone – nor was that its original intent. Its original intent was to protect the innocent. When it *really* works today, it protects only the guilty.

Rink Parker
Gulfport, Miss.

Systems Designers Must Keep Walls From Tumbling

. . . And in This Corner

By Kenniston W. Lord Jr.

Special to Computerworld

A friend with whom I used to share the lecture circuit once astounded me by telling a class, "Building a system is just like building a brick wall. You put in a footing and place the bricks in place course by course."

When I was introduced, I proceeded to dispute his remarks.

To begin with, in order to build a brick wall, there are some laws, natural and civil, with which we must contend.

And then there are some standards for the brick.

And the mason has a right to be able to rely upon these specifications.

Then take the mason. A mason must have gained some minimum amount of education and have undergone some minimum form of training. He must have served an apprenticeship under the watchful eye of a journeyman.

And before he is able to practice his skill independently for gain, he must demonstrate to some regulatory authority that he does indeed have that skill and experience.

Next, what about the wall? There are building codes and safety codes, rules and regulations to which the mason and the brick with which he works must conform.

The brick must conform not only to the laws of nature but also to civil code, for if it does not there is someone with the authority and the power to direct that the wall be disassembled and to make it stick.

Why? Because the brick wall user – the public – has a right to be protected from a violation of natural laws and civil codes, to say nothing of shoddy workmanship. It's just a simple fact that society has decreed its citizens will be protected despite their unawareness of that protection.

The public which is subjected to data processing abuse is afforded no such protection. An individual does not know who has data about him and why, but he knows that data does exist. He has no assurance that you, the DPer, took his interest to heart as you designed your system. He does not have any assurance whatsoever that the system you build will protect his life, health or property.

He knows that when he walks by that brick wall somebody has taken steps to protect him as far as possible. But he does not know that any similar steps have been taken in his regard by those who would computerize him.

Without belaboring the point, he does not know he will be in any manner protected when we DPers get through with him. I think he has a right to have that assurance.

For all the problems we have witnessed with other professions, one thing is abundantly clear – the standards employed tend ultimately to purge the unethical, incompetent and dangerous practitioner, for in the end the unsuspecting public will be protected, whether they recognize it or not.

In short, DPers may – and not too far into the future – be facing a people vs. computer backlash. Forewarned is forearmed. But forewarned and ignored will only increase the amount and scope of the backlash. The time simply is now to take the steps to find a way to place some form of mandatory controls upon the systems we build.

Forms of Mandatory Control

These mandatory controls may take one or more of several forms. It may happen in the form of civil approval of system design specifications, as in Berkeley, Calif. It may take the form of restrictive legislation, like that concerning privacy. It may take the form of educational standards – minimum learning criteria dictated by a legislative body. It may take the form of mandatory auditing requirements for the use of systems. It may take the form of systems certifications under specialized cases.

It may take the form of people certification. Or it may take the form of licenses to practice, penalties under violation of that practice. And then, it might well take the form of the refusal of the public to let you treat personal data on your computer.

However you slice it, something is going to happen. It may be this year, next year or the day after you retire. For sooner or later the public, the brick wall user, is going to become suddenly aware it is sick and tired of being treated as a number, carelessly, callously and with indifference.

And when that happens, the public will become suddenly aware you have within your hands the power to maim, injure, cripple and perhaps kill it.

With that awareness, folks, you will not only lose a profession – you'll lose a job.

Now what?

Things really bloomed when you first put your 3270 on line.

But now your system's growing like a jungle.

Your phone lines or your mainframe go down...so your 3270 just sits idle.

And when everything is working, your lines jam up and your mainframe bogs down...so your 3270 works a lot more slowly than you'd expect.

Errors keep cropping up, but your 3270 can't weed them out.

And you'd really like to keep a small data base at your terminal for fast access...but your 3270 can't even begin to handle that.

May we suggest a simple and sure solution? Add or replace with the Sanders 8170.

The Sanders 8170 is completely compatible with the 3270. Emulates it 100%, without requiring debugging or new software. Costs less too. And that's just the start.

As you grow, Sanders enhancements keep your 8170 growing with you by distributing the processing ...without wiping out your initial software investment.

For example:

When your phone lines are clogged or down, Sanders Queued Transaction Handling stores your data locally until your mainframe becomes available.

Operator errors? Sanders Local Validation and Arithmetics catches errors on the spot. Sanders Local File Reference lets you see names or descriptions whenever you enter an account number.

Need more speed and flexibility? Sanders Local Format Storage speeds up your operation by eliminating the transmission of lengthy formats. Sanders Automated Keystrokes give you multi-key entry from a single key depression. And Sanders Formatted Local Print lets you select, rearrange, and print data without host intervention.

Sanders 8170, The Intelligent Answer. Compatible. Lower Priced. Does more because it distributes the processing. And immediately available, so you can replant before you get lost in the jungle.

SANDERS DATA SYSTEMS GROUP
Sanders Associates, Inc.

Home Office: Daniel Webster Highway, South Nashua, New Hampshire 03060 (603) 885-6685 • Sales Offices: California (415) 692-2485; (213) 641-4613 • Colorado (303) 771-4380 • Connecticut (203) 246-7289 • Florida (305) 592-7424 • Georgia (404) 451-8815 • Illinois (217) 529-0221; (312) 693-2087 • Louisiana (504) 887-7904 • Massachusetts (617) 889-9061 • Michigan (313) 358-4260 • Minnesota (612) 854-5695 • New Jersey (201) 636-0722; (609) 665-3350 • New York (212) 489-7750 • North Carolina (704) 527-2642 • Ohio (216) 888-7300 • Oklahoma (405) 235-1421 • Pennsylvania (412) 563-3313 • Texas (713) 681-5821; (214) 233-0691 • Virginia (804) 270-0602; (703) 920-5204 • Washington (206) 363-3930 • Wisconsin (414) 543-6240 • International Subsidiaries: Germany 67 80 39 • UK (01) 499-9452; (061) 228-3565 • International Distributors: Australia 888-8111 • Denmark 14.63.04 • Italy 34.44.59 • Japan 543-7611 • New Zealand 664-149 • Venezuela 781-8888

Sanders Data Systems Group, Nashua, N.H. 03060
Help! I've got a growing need
to know more about your 8170.
Name ____________ Title ____________
Company ____________
Street ____________ City ____________
State ____________ Zip ____________ Phone ____________
*Trademark of Sanders Associates, Inc.

Announcing A New Reference Source
for Time-Sharing and Remote Computing Users

**INTERACTIVE
COMPUTING
DIRECTORIES**

Compiled by
The Association of Time-Sharing Users
An Independent, Non-Profit Association

For information about the directories and a
complimentary copy of the Newsletter of the
Association, write to ATSU, 75 Manhattan Drive,
Boulder, Colorado 80303

Concentrating Only on Cost, Schedule Can Make Breakthrough a Breakdown

By Miles Benson

Special to Computerworld

Breakthroughs are sometimes not all they're cracked up to be.

I remember the software breakthrough which was apparently so large that its announcement bypassed the computing literature and went straight to *Business Fortune* magazine. And I remember the inside-the-computing-field horse laughs which accompanied the knowledge that the breakthrough dissolved swiftly into a "Project Which Failed."

To the best of my knowledge, I'm afraid, *Business Fortune* never corrected its error publically. But that's breakthrough biz, I guess.

The Sociology of Computing

The background for this particular breakthrough began in the early '60s when a leading hardware house, Marketronics, announced the latest birth in its second-generation family of computers.

The Marketronics 2410 was born without software, which is not of course unusual in the computing field. What was unusual, though, was that Marketronics had a plan to do something about that.

Marketronics research, concerned about the cost and schedule problems associated with software implementation, had come up with a solution. The 2410 was the pilot system on which the solution would be proven. And the solution was a software building system called Phoenix.

Now Phoenix was more than a set of software tools, although it was primarily that. It was also a philosophy.

And the philosophy went something like this: The problem with software construction is that it requires a lot of high-talent folk for a long period of time. The solution to the problem lies in building the talent into a set of tools so smart that a few low-talent folk can do the same job in a short period of time.

Stop laughing. Remember, this is the early '60s.

Back at the Marketronics ranch, the research folk fanned the managerial fires, and the Phoenix Software Implementation System emerged from the structure of the philosophy. Phoenix took a half-dozen or so man-years to build, but the stakes were high and Marketronics never doubted the wisdom of its investment (not during the implementation phase, that is).

Now, enter the 2410 computer and the first test of Phoenix and its philosophy. To compete in its chosen marketplace, the 2410 needed a large bundle of software – an Input/Output Processing System (IOPS), a macro assembler (MA), a Report Generator Utility (RGU) and a Cobol compiler.

Those were the basics. Get those out of the way quick, the Phoenix philosophy said, and Marketronics could get into building some application software which might support sales to specific industry customers.

And there was the real market potential of the 2410 on the line. Phoenix needed to work.

Get set for a surprise: Phoenix *did* work! MA was on the air and satisfying Quality Control in a couple of months. IOPS followed along behind a couple of months later. RGU was done at the same time.

And even complicated Cobol, to full corporate standards, took only eight months. Marketronics managers fairly danced with glee.

And that's when the *Business Fortune* article was published. The breakthrough was really a breakthrough. From hardware birth to full software system support in under eight months. That was worth bragging about.

The Fall That Pride Goeth Before came slowly to Phoenix. There was the usual number of system trouble reports (STR), but they didn't scare anyone.

Software quality wasn't the prime goal of this particular breakthrough – only cost and schedule were. And quality wasn't surprisingly low.

What *was* wrong with Phoenix, and with the 2410 software, didn't emerge until the STR situation stabilized.

IOPS serviced interrupts about as rapidly as Aunt Jemima flows through a pinhole.

MA used as many passes to assemble as there were user macros defined, and that meant assemblies usually had to be scheduled by users on weekends.

RGU, slowed by IOPS, produced reports only slightly faster than the clerks in the shop had been doing it by hand.

And Cobol – alas, Cobol – compiled so slowly that computer operator shift changes occurred in the middle of 90% of a typical user's compilations.

You've got to give Marketronics credit for one thing . . . it knew when to admit it was wrong. Phoenix usage, after an appropriate investigation, was halted.

Users were notified that 2410 software was acknowledged to be seriously inefficient and that it would soon be withdrawn in favor of newer deliveries.

Not surprisingly, though, no one notified *Business Fortune* of this turn of events.

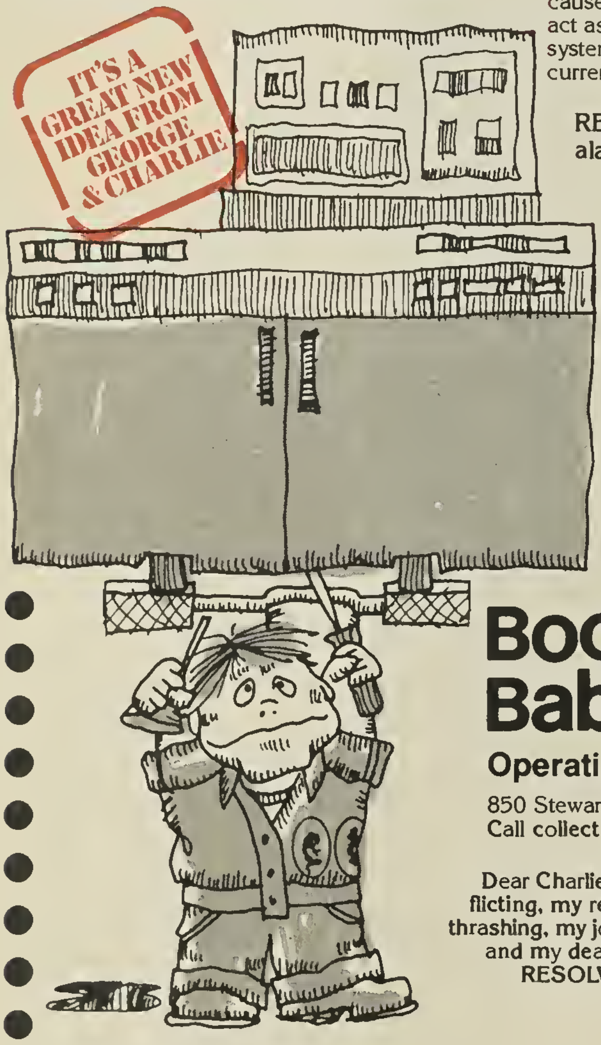
Now, in real time, you can RESOLVE™ enqueue conflicts, reserve lockouts, paging thrashing, jobs looping or in a wait state, jobs hung in the system, and provide deadline management for critical jobs – with RESOLVE™.

RESOLVE is a real time problem solver which lets you diagnose and fix the major causes of IPL's as they occur.

Ever have that "gut feeling" that your system was slowing down, operating inefficiently, about to crash—and you didn't know what to do about it? Have you seen your system become sluggish on a specific job, but lacked the tools to relieve the bottleneck? Have you wondered if a comprehensive package would ever be developed that would help you diagnose and solve problems on-line, in real time? Sure you have. One thing you know for certain—down time and missed schedules cost your installation real dollars.

But now, with RESOLVE, if you notice a slowdown occurring, you can address the problem immediately. Examine it. Diagnose it. And take corrective actions recommended by RESOLVE to eliminate these problems. Up to now, analysis products provided after-the-fact problem reporting. RESOLVE allows you to diagnose and solve these same problems on-line in real time.

In a nutshell, RESOLVE is a real time problem program that provides over 30 commands to operators and authorized TSO users. OS, VS, HASP, and ASP don't provide diagnostics. RESOLVE does. Each service addresses the diagnosis and solution of a system problem which causes system lost time or IPL's. These services act as new tools for increasing operators' and systems programmers' productivity in solving current bottlenecks.


IT'S A GREAT NEW IDEA FROM GEORGE & CHARLIE

RESOLVE is an early warning alarm system.

If critical system resources become exhausted, your system can "crash" for no apparent reason. RESOLVE precludes IPL's by issuing a warning message when system resources reach critical levels, and tells you how to correct the problems.

Find out just how good RESOLVE really is by trying it for 21 days. Free.

RESOLVE is now available for MFT, MVT, VSI, SVS, and MVS. Monthly rental or purchase plans available.

Boole & Babbage THE PERFORMANCE PEOPLE GEORGE CHARLIE

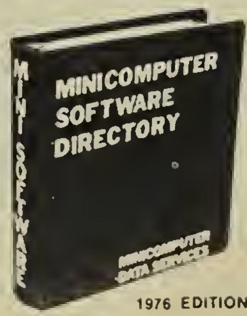
Operations Division

850 Stewart Dr., Sunnyvale, CA 94086
Call collect: (408) 735-9550.

Dear Charlie and George: My enqueues are conflicting, my reserves are locked out, my paging is thrashing, my jobs are looping, waiting and hanging, and my deadlines are unmanaged. ☐ Send me RESOLVE—free, to try for 21 days—today!

Name ____________ Title ____________
Company ____________ Phone ( ) ______ - ______
Street ____________
City ____________ State ____________ Zip ____________

FIND MINI-SOFTWARE SERVICES FAST



1976 EDITION

**MINICOMPUTER
SOFTWARE DIRECTORY**

Instant access to descriptions of hundreds of minicomputer software packages and services.

DIRECTORY INDEXED 4 WAYS
- Indexed by applications and services
- Profiles of supplier companies
- Geographic locator
- CPU's supported by suppliers

Annual Subscription $70

INITIAL ISSUE plus 2 updates Send check or PO

MINICOMPUTER DATA SERVICES
20 COVENTRY LANE, RIVERSIDE, CT. 06878

Planning, Available 158 Eases DOS/VS-OS/VS Shift

By Don Leavitt
Of the CW Staff

LAKE SUCCESS, N.Y. – Some have called this town's name very appropriate for the personnel at the Chemical Bank's (Chembank) personal credit center here who recently completed conversion of a massive DOS/VS operation to OS/VS.

They not only changed operating systems and 1,000 program modules; they also moved the work from an IBM 370/145 to a 158 and added a new application in the process.

And the whole project was completed about a month ahead of time, according to assistant vice-president Lewis Berlent, who is in charge of the center.

Meanwhile, another group of Chembank people was shifting work from a second 145 and onto the bank's other major data center in New York City. Now both rented 145s have been returned to IBM.

The possibility of moving from the 145s was first recognized early last year when Chembank acquired Security National Bank on Long Island. Security had a 145 which it rented and a 158 which it owned.

Although hardware consolidation was a very obvious and desirable goal, there was originally some question on where the consolidated operations should be run, Berlent recalled.

The decision was made to stick with the two Chembank sites and to eliminate the separate Security operations. The owned 158 was to be moved to Lake Success.

All work not related to personal credit was moved from Security to Chembank's New York City center last year. Installation loan accounting operations, still handled in New York, were to be moved here and – "since it was better than ours" – the system used by Security was to replace the one used by Chembank, Berlent said.

Conversion of the workload at Berlent's center started last summer with a review of the on-line programs, including Master Charge credit-card processing. Two or three people were involved at first, "just getting to know the system" since it had to be rebuilt from self-contained operations to work under Chembank's "homegrown" teleprocessing monitor system.

There were 16 major on-line programs; all had to be revised to include reentrant code. Ten had to be rewritten because of file designs that would be inefficient under OS/VS, Berlent said, noting coding was begun heavily in mid-autumn.

Detailed work in planning the move of batch programs to the 158 began in January and was soon recognized as "more cumbersome" than the on-line work, though not necessarily as complicated.

JCL statements for every one of the 1,000 program modules had to be changed. That was "probably the biggest chore," Berlent said, but modification of programs with console display messages was another problem.

To eliminate as many messages as possible, the batch conversion team "decided to let the system decide what was important enough to tell the operator. When we encountered conditions that would have caused a message under DOS/VS, we went to an error routine," he said.

Unless the current condition exceeded a predefined threshold, the error was logged but no message was generated and no operator intervention was needed.

One of the toughest problems the group encountered was the changeover of the mortgage loan accounting package Chembank had acquired some time ago.

"We had to take it apart and 'unoverlay' it, for one thing. Changing all the I/O modules, which were in Assembler, was also tough," Berlent said.

Coding changes in the Cobol programs were generally not difficult, he acknowledged, since it was largely a matter of fixing Select statements and FD sections. Nothing ever happened to make his staff feel they had to call in outsiders to solve a problem, he added.

Having the 158 in place and uncommitted to production from March until June "certainly gave us a big boost," the vice-president said. The on-line conversion group worked days, the batch crew nights – with no interruption.

And the batch crew, in particular, learned to use TSO as a program development tool even though it took too much out of the system to use once production started.

The programmers used a double conversion approach since programs were subject to constant updating even while the conversion was going on. Once OS/VS versions were compiled, any changes in the DOS/VS programs still in production were also made in the OS/VS "copies."

But there was always the danger that some changes weren't picked up so, just before live work was to start under OS/VS, all the DOS/VS programs were again converted.

The whole project worked smoothly because "all our people wanted it to work" and because Berlent and his management crew pushed for a project checklist of tasks to be done before anything else started. And the programmers stayed with the operators around the clock for the first month of actual operations.

There couldn't be any unsolved problems. The 145s were shipped out the day after live work started.

'Dfast/VS' Frees Disk Space

FORT LEE, N.J. – Dfast/VS, a disk management package from Oxford Software Corp., allows DOS/VS users to work with any date-expired disk space as a partition-independent resource from which any type of file – except Vsam – may be allocated, the vendor said.

Based largely on Oxford's earlier Dfast, this package was developed "because, outside of the DOS/VS facilities available for allocating and managing Vsam files, IBM offers the user few tools for disk management," a spokesman claimed.

In addition to reusing "expired" disk allocations, Dfast/VS makes up for overallocation of extents on live files by truncating sequential and prime area Isam file space to the end-of-file marker at Close time, he said.

The package also provides the ability to dynamically allocate both permanent and temporary file space on disks shared by two or more CPUs, the spokesman continued.

A feature called Public Space Management (PSM) reportedly allows the user to dynamically allocate file space across pack boundaries. With PSM, extents for a data file can be defined on a "pseudopack" which may consist of two or more real packs or portions of them.

Related capabilities enable users to "absolutely protect" a file from being accessed or to selectively prevent a file's use by anyone except the current user, Oxford said.

PSM also provides the means of defining which packs or areas within those packs are available for dynamic allocations.

Device-independent file handling, beyond facilities available from IBM, are also part of the system, Oxford said.

The package also includes a reporting module which generates statistics about the use of files under Dfast/VS control.

Dfast/VS ranges in cost from $225/mo to $350/mo or from $5,625 to $8,750, depending on options selected.

Oxford is at 158 Linwood Plaza, Fort Lee, N.J. 07024.

Datapoint Adds Cobol for 5500; Compiler Based on '68 Standard

SAN ANTONIO, Texas – A Cobol compiler introduced by Datapoint Corp. for its 5500 disbursed processing systems is an implementation of American National Standards Institute (Ansi) 1968 Cobol specifications "with selected features of Ansi-74 also included," the vendor said.

With the new software, programs can be compiled on a 48K Datapoint 5548 Advanced Business Processor with disk storage and executed on "any" 5500 processor with user-required peripherals, the spokesman added.

Ansi Cobol '68 facilities supported by the compiler include Nucleus, Level 1; Table Handling, Level 2; Sequential Access, Level 1; Random Access, Level 1; Sort, Level 2; Segmentation, Level 1; and Library, Level 2, he said. Several features from Level 2 of the Nucleus and the Sequential and Random Access modules have also been included, he noted.

Features from the 1974 Ansi specifications include various mathematical options; WRITE statement differences; and CALL and EXIT capabilities comparable to those in the Inter-program Communications module.

Reflections of '74

Support for software-based programming switches and allowance for more relaxed punctuation and more flexible comment facilities – all of which reflect Cobol '74 – are also included, Datapoint said.

File compatibility between Cobol and all other Datapoint languages and between Cobol on the Datapoint gear and Cobol on a central mainframe is also a design goal of this compiler, the spokesman added.

Transparent Management

Indexed sequential files are supported; dynamic allocation and deallocation of disk space under that and other access methods is transparent to the user, he said.

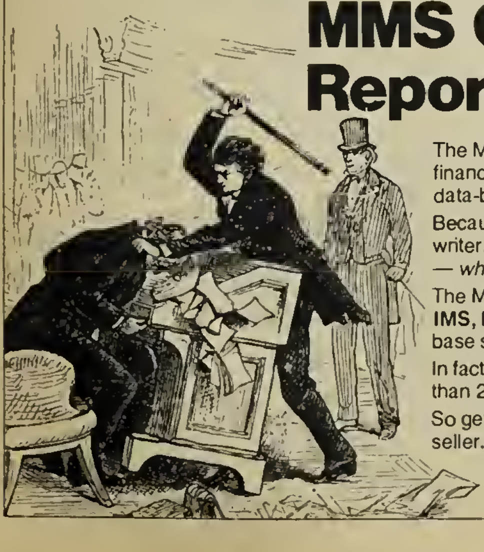
Users may license Datapoint's Cobol for a one-time charge of $2,500 or for $65/mo. Maintenance support and documentation costs an extra $20/mo under either plan. The software will be ready for distribution in September, the company said from 9725 Datapoint Drive, San Antonio, Texas 78284.

NTIS Reprints Study Of Basic Compilers

SPRINGFIELD, Va. – "A Comparative Evaluation of Versions of Basic" by Bennet P. Lientz, published in the April 1976 issue of the *Communications of the ACM,* is now available from the National Technical Information Service (NTIS).

The article compares 10 current versions of Basic with each other, with two earlier versions and with the proposed standard for minimal Basic [CW, April 12].

Eight pages long and cataloged as AD-A024 247/9WC, the study costs $3.50 (paper) or $2.25 (microfiche) prepaid from NTIS at 5285 Port Royal Road, Springfield, Va. 22161.



MMS General Ledger prevents DBMS* Financial Reporting headaches.

The MMS GENERAL LEDGER has been designed to make financial reporting accurate, flexible and painless — even in a data-base oriented system.

Because of the most powerful General Ledger Package report writer, every user of the system can get exactly *what* he wants — *when* he wants it! It's that easy.

The MMS GENERAL LEDGER also works under **DOS, O/S, IMS, IDMS,** or even **TOTAL.** So no matter what your data base system is like, the MMS GENERAL LEDGER is at home.

In fact, the MMS GENERAL LEDGER is hard at work for more than 250 leading corporations around the world.

So get the MMS GENERAL LEDGER . . . the world's No. 1 seller. And prevent some nasty headaches.

*Data Base Management System

Please send me more information on how MMS GENERAL LEDGER is better than aspirin in a data base environment.

☐ General Ledger ☐ Accounts Payable ☐ S/3 General Ledger
☐ Accounts Receivable ☐ Payroll

name ______ title ______ system ______
company ______ street ______
city ______ state ______ zip ______ phone ______

SOFTWARE INTERNATIONAL
Elm Square, Andover, Mass. 01810 (617) 475-5040
New York (914) 332-0040 Chicago (312) 729-7410 Phila (302)995-7101
Dallas (214) 233-5856 Los Angeles (213) 981-6117 Toronto (416) 862-0521

FDR-DSF
ANNOUNCES AN ENHANCEMENT
3350/44
Support
Native Mode Compatibility Mode

Fast Dump Restore
- Dump/Restore Full Volumes
- Diagnostic Processing

Data Set Functions
- Dump/Restore up to 250 Individual Data Sets
- Restore Data Sets from FDR Full Volume Backups

Volume and Data Set Level Password Protection
Performance — Reliability
Supporting
2314 • 3330-1 • 3330-11
3340-35 • 3340-70 • 3344 • 3350

An enhancement to FDR/DSF 3350 Support is now available to all FDR V4.0 users under The Innovation Maintenance and Enhancement Plan.

For further information or Free 30-day Trial, call or write to:
INNOVATION DATA PROCESSING
970 Clifton Avenue, Clifton, NJ 07013 • (201) 777-1940

TIME MOVES ON

...and it's time to move to UNITED!

HARDWARE — IBM 360/195, OS-HASP (RJE), 2.2 meg, 3330's, 2314's (360/65 fallback)
SOFTWARE — UAL/ACS ICES! MPSX, GPSS, PMS, SSP, OSIRIS, BMD, MARK IV. All standard compilers, and more.
COMMUNICATIONS — 2000 to 9600 BAUD, Dedicated or Dial-Up, Auto-Answer WATS lines.
SERVICE — Guaranteed Turnaround!
COST — You'll Save Up To 50%!
EXPERIENCE — Over 4 years serving companies on a nationwide basis.
RELIABILITY — Better than 98.5% uptime!

The move to United will save you time and substantially decrease your data processing expense. Let us show you. Contact us today to schedule a benchmark or for additional information.

UNITED AIRLINES

Computer and Communications Services Division
Denver Technological Center
5350 South Valentia Way
Englewood, Colorado 80110
Telephone (303) 779-2000

'Profile' Pinpoints Program Problems Without Using Data Collected by SMF

LOS ANGELES – CACI, Inc.'s Profile II, designed to locate and eliminate bottlenecks in programs running under OS or VS environments, does not use IBM's SMF data as the basis for evaluations, its vendor noted.

Profile consists of two major components, a monitor program and a report generator. The monitor oversees execution of the user program to be analyzed, issuing timer interrupt requests and, at each interrupt, making an entry on a trace file, a spokesman explained.

The report generator reads the trace file and produces summaries of the sampling data collected by the monitor. The most significant output, according to CACI, is a histogram showing the distribution of CPU time utilization within a program.

Identifies Control Section

In contrast to some other monitoring packages, however, Profile identifies control sections and not just core locations in its histogram.

This makes the graph easier to use not only with Cobol, for example, where the user does not normally function at the core location level, but with relocating systems which place programs "almost anywhere they want," CACI suggested.

The output shows what is using the most CPU time and is therefore the most likely candidate for rework to improve the operation of the whole program, the spokesman added.

Profile requires no modification of the operating system, "nor does it in any sense usurp control from the operating system," CACI noted.

"Perhaps more important from a user standpoint," the programs being monitored require no modification either, the vendor said.

Perpetual use of the Profile II system is available for $8,600. A time purchase is also available for $280/mo for 36 months, CACI said from 12011 San Vicente Blvd., Los Angeles, Calif. 90049.

Master Key Gives Access To 'Cryptex' Coded Files

NEW YORK – Cryptex-MK from Bi-Hex Co. is a software security product designed on the same principle as a mechanical lock master key system, according to a spokesman.

The package was derived from the original Cryptex program, "but it really is far more complex," he added.

The system logic is said to let DP users in "any IBM-type operating system" make up their own cryptographic keys for enciphering any data regarded as private. The encoding can be applied at the record level, but not at the field level, the company said.

Data Passed

Keys and data are passed to the Cryptex-MK system by means of a called reentrant subroutine; the enciphered result is passed back to the user.

To retrieve the original data, the next user must supply the enciphered data and the same key used to encipher or the system master key.

The user's private key and the master key together form an 8-byte key which Bi-Hex described as similar in size to the data encryption standard promulgated by the National Bureau of Standards.

It is possible to change the system master key at will, the vendor said, without affecting any user's access to previously enciphered data. Master keys obsoleted by such a change cannot be used to access any data in the system, the spokesman added.

Cryptex-MK is seen by the vendor as "especially useful" in time-sharing environments in which individual users insist on privacy but the custodial responsibility of the network supervisor may require the possibility of unlimited access.

Cryptex-MK is available as a 2K object module supplied with tailored JCL and test program. The system costs $1,250 which includes two copies of the instruction manual and program support for 90 days.

Bi-Hex is at Suite 303E, 200 Park Ave., New York, N.Y. 10017.

ASI Course Aims at Vsam

ELK GROVE VILLAGE, Ill. – A multimedia course focusing on IBM's Virtual Storage Access Method (Vsam) and Access Method Services has been developed by Advanced Systems, Inc. (ASI).

The course includes seven videotapes, four audio tapes and guides for both the course coordinator and students, the company said.

"Vsam and Access Method Services" was designed for applications and systems programmers who create and maintain Vsam data sets and catalogs. It will also facilitate managers' and analysts' understanding of the capabilities of Vsam, according to ASI.

The training package lasts 22 to 24 hours and includes four hands-on exercises enabling students to execute Access Method Services jobs on their own computers, the vendor noted.

The course is said to include the latest features and changes of Access Method Services, incorporating the Independent Component Release used with Enhanced Vsam. A feature unique to the Enhanced Vsam, the alternate indexing concept, is also explained.

The course applies to any OS/VS environment; situations in which differences occur between VSI, VS2 Release I (SVS) and VS2 Release 2 and later MVS releases are clearly indicated, ASI said.

"Vsam and Access Method Services" is availble for purchase or as part of the vendor's subscription library, a spokesman noted from 1601 Tonne Road, Elk Grove Village, Ill. 60007.

CPE
PLAN TO ATTEND:

AN INTRODUCTION TO SOFTWARE PHYSICS
(4 day courses)

Houston:	**August 30**
San Francisco:	**Sept. 7**
Denver:	**Sept. 20**
Chicago:	**Sept. 27**
New York:	**Oct. 11**
Washington:	**Oct. 18**
Atlanta:	**Oct. 26**
Toronto:	**Nov. 1**

The applications of software physics to all major CPE & capacity management topics are covered. Topics include:
- Performance characterization & uses of CPE measurements
- Configuration capacity planning
- Workload characterization & forecasting
- Configuration efficiency

SOFTWARE PHYSICS AND EDP JOB COSTS & CHARGES
(4 day courses)

Chicago:	**Oct. 5**
Washington:	**Nov. 1**

Thoroughly covers costing, charging, and EDP productivity as an engineering application of software physics.

COURSE PRICES:

Members:	**$350**
Commercial:	**$600**

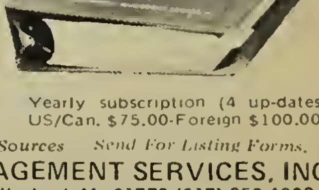
(Includes a copy of the corresponding Software Engineering Report)
For registration or information, contact:

INSTITUTE
for
SOFTWARE ENGINEERING

P.O. Box 637
Palo Alto, CA 94302
(415) 493-0300

LOOKING FOR MINICOMPUTER SOFTWARE?
LIKE TO SAVE MONEY?

Reuse existing minicomputer software! Save 10-90% of your expected development costs. The MINICOMPUTER SOFTWARE QUARTERLY lists available, proven minicomputer programs from many sources. Each comprehensive listing describes in detail:
- Program functions
- Hardware/OS requirements
- Price * Support * Warranty
- Organization to contact



Yearly subscription (4 up-dates)
US/Can. $75.00-Foreign $100.00)

Software Developers Sources *Send For Listing Forms.*

INTERNATIONAL MANAGEMENT SERVICES, INC.
70 Boston Post Rd., Dept. C-12, Wayland, Ma 01778 (617) 358-4903

Dear Computerworld:

I (borrowed) (stole) (shared) (copied) this issue of *Computerworld*, and it made me:

☐ PROUD
☐ SKEPTICAL
☐ ANGRY
☐ PLEASED
☐ INVOLVED
☐ AWARE
☐ CURIOUS
☐ EXCITED
☐ DEMANDING
☐ FURIOUS
☐ INFORMED
☐ SURPRISED
☐ ALL OF THE ABOVE

☐ **PLEASE ENTER MY SUBSCRIPTION**
(details on back)

Put old label or label information here

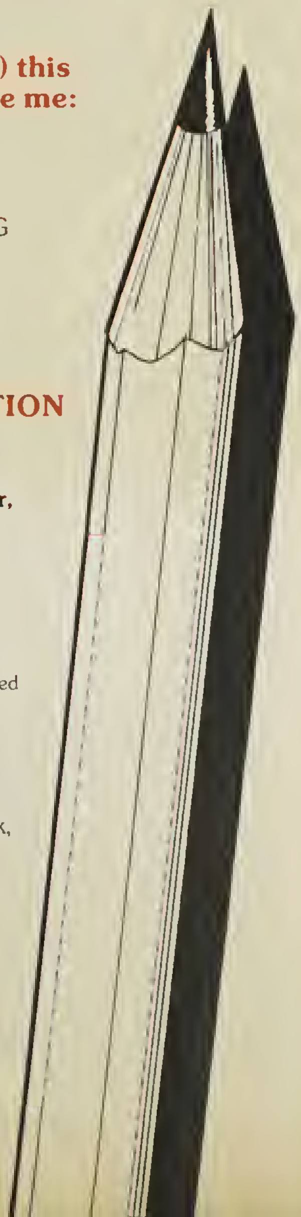
☐ **I'm already a subscriber, but I'd like you to change my:**

☐ **address**
☐ **title**
☐ **industry**
☐ **other**

My current mailing label is attached and I've filled in new information on the other side.

Note:
Please fill out form on back, detach and insert in post-paid envelope attached through binding.
Thank you.

COMPUTERWORLD



Please send me **COMPUTERWORLD** *for 1 year* RATES: U.S. - $15 Canada and PUAS - $23 Other foreign - $40

☐ Check Enclosed

☐ Charge My American Express Account

If charge we must have cardholder's signature:

First Initial | Middle Initial | Surname

Your Title

Company Name

Send to: Address

City | State | Zip Code

Address shown is:
☐ Business
☐ Home

☐ Check here if you do not wish to receive promotional mail from *Computerworld*

COMPUTERWORLD

CIRCULATION DEPT. 797 Washington Street, Newton, Mass. 02160

PLEASE CIRCLE 1 NUMBER IN EACH CATEGORY

BUSINESS/INDUSTRY

10 Manufacturer of Computer or DP Hardware/Peripherals
20 Manufacturer (other)
30 DP Service Bureau/Software/Planning/Consulting
40 Public Utility/Communication Systems/Transportation
50 Wholesale/Retail Trade
60 Finance/Insurance/Real Estate
70 Mining/Construction/Petroleum/ Refining
75 Business Service (except DP)
80 Education/Medicine/Law
85 Government - Federal/State/Local
90 Printing/Publishing/ Other Communication Service
95 Other:

TITLE/OCCUPATION/FUNCTION

11 President/Owner/Partner/General Manager
12 VP/Assistant VP
13 Treasurer/Controller/Finance Officer
21 Director/Manager of Operation/Planning/ Administrative Service
22 Director/Manager/Supervisor DP
23 Systems Manager/Systems Analyst
31 Manager/Supervisor Programming
32 Programmer/Methods Analyst
41 Application Engineer
42 Other Engineering
51 Mfg Sales Representative
52 Other Sales/Marketing
60 Consultant
70 Lawyer/Accountant
80 Librarian/Educator/Student
90 Other:

Detach here, fold, and place in post-paid envelope attached through binding.

DP Dialogue

Notes and observations from IBM which may prove of interest to data processing professionals.

Distributed processing has stepped up the efficiency of warehouse operations at Wilson Sporting Goods Co.

Distributed Processing Links 25 Wilson Field Locations

Few companies today operate entirely out of one location. Even small firms are likely to have regional sales offices,. while larger businesses may have dozens of operating units scattered across the country. For such organizations, a distributed processing system may help bring about some notable operating efficiencies.

Wilson Sporting Goods Co. of Chicago, a division of PepsiCo, is an outstanding example. Wilson is both a manufacturer and distributor of sporting goods, with one of the broadest lines in the industry. The company recently realigned its distribution network and now has 21 sales offices, each of which stocks some inventory, plus 4 large regional distribution centers. An IBM 3790 Communication System links all 25 locations to a System/370 Model 158 computer.

In a distributed processing system like the 3790, the workload is shared between the central computer and smaller units called controllers, which act as small processors. In the Wilson network each location has a controller online to a cluster of terminals and a printer, creating 25 small computing centers with local data processing capability.

Typically, after an order is entered at a Wilson sales office, it is transmitted via the 3790 to the Model 158 which forwards it to the appropriate regional center or centers. As the order is being processed, Wilson's companywide data base—including open orders, shipped orders and inventory—is updated. Customer inquiries concerning order status can be answered quickly through any terminal in the network.

"Customer service has benefitted greatly with the 3790," says Phillip D. Matthews, vice president, distribution. "The time required to process and ship orders has been cut almost in half. All our sales offices now get order and inventory reports overnight, instead of two or three weeks later. And nine out of ten items ordered are filled on demand, without backordering. Overall, office and warehouse productivity rose 30%.

"The system has made possible much closer coordination between manufacturing and sales," he adds. "Since we are constantly up to date on order volume, we can adjust production in advance to meet demand.

"All these factors, plus our new physical distribution facilities, have culminated in a reduction of approximately $10 million in our total inventories–which in turn has increased cash flow and reduced our need for working capital."

The 3790 runs under Systems Network Architecture (SNA), an advanced IBM teleprocessing structure that unifies communications networks for greater efficiency and easier growth.

Alyeska Develops a Total DP System in Record Time

When the Alyeska Pipeline Service Company was formed in 1970 to supervise the design and construction of the Alaska pipeline, many of the details of the project were still a big question mark. The only absolute certainty was the immensity of the challenge, particularly in the area of management control. The job called for the development of a total data processing system which would be flexible enough to handle very rapid growth.

Every aspect of the planning, construction and administration of the 800-mile pipeline must be fully documented to meet Federal environmental and regulatory requirements. That includes keeping track of inventory consisting of everything from Arctic outer gear to spare parts, managing a work force which swells to over 20,000 during the summer and providing accounting information for thousands of separate parts.

From the beginning, Alyeska has relied on various IBM computers to help handle the information. As the project progressed, the quantity of accounting data mushroomed quickly. "We went from processing less than 100 invoices a day out of our temporary offices in Seattle in 1974 to handling between 2-to-3,000 invoices daily on our Model 145 with VS/1 today," says Art Potter, manager of systems and computing. "Our online data base now includes over 2,500,000 records and it's still growing."

The toughest part of planning the system, according to Potter, was anticipating future data processing requirements without specific guidelines. "It was like compressing a 10-year corporate history into two years." says Potter, "We had to get every application up within a few months, because the actual pipeline construction was moving ahead so quickly."

Alyeska's system includes data processing equipment at five major construction sites and the Model 145 in Anchorage. Overall, the system must keep track of all the bills submitted to Alyeska by nearly 10,000 subcontractors. Each week, a performance report on pipeline progress is sent to the eight oil companies that own Alyeska for review on costs and efficiency.

Ultimately, records of all the expenses associated with the pipeline will go to the Interstate Commerce Commission (ICC) which is responsible for determining the rate of return the oil companies will be permitted to earn on their investment. Every expense will have to be documented and justified for the ICC.

When the pipeline is finally completed Alyeska will be responsible for the total operation of the pipeline and terminal facilities at Valdez, Alaska. Currently new data processing applications are being developed to support these pipeline activities. For example, sensing devices along the pipeline will transmit information to a computer in Valdez, which in turn will communicate with the System/370.

"One thing is certain," says Potter, "we could never have coordinated a project of this size without the computer. The financial accounting alone would have been a nightmare. We are confident that the experience our staff has gained working under the Alaskan constraints will provide us with the ability to develop the applications required when the oil starts to flow."

A pipe casing is welded on the Alaska pipeline. To help manage the $7 billion project, the Alyeska Pipeline Service Company is using an IBM System/370 Model 145.

In Texas, a Giant Data Base Produces King-size Results

What insurance company has insured every military man who has walked on the moon? What's the largest property and casualty insurance company headquartered in Texas? Who is San Antonio's biggest private employer?

The answer to all three questions is the United Services Automobile Association. USAA is a unique member-owned cooperative, with over a million policyholders. Most members are active or retired commissioned officers in the armed forces and their dependents—and they're stationed all over the world.

The USAA home office is one of the world's largest and most efficient office buildings.

USAA has no agents. Its policyholders communicate with it mostly by mail and telephone.

To help meet their insurance needs—automobile, home, life, property—with efficiency and dispatch, USAA relies on a comprehensive IBM computing system built around an immense data base. It's one of the largest data bases running under IBM's IMS (Information Management System) used by any property and liability insurer anywhere, with 4.8 billion characters of online storage. The system runs on an IBM System/370 Model 168 computer.

The data base is remarkable for more than size. Unlike the insurance industry practice of indexing by policy numbers, USAA indexes by account (policyholder) numbers. Account numbers are cross referenced to policyholder's names. An average of three active policy numbers are carried under each account number.

This innovative policy of "a name, not a policy number" has some unusual advantages. A complete profile of any member's policies and other data can be flashed on any of 275 visual display terminals, both at the San Antonio home office and at five regional service offices around the country. Much of this data can be updated online, with the rest processed overnight.

And the transactions are copious. They include a daily average of 36,000 automobile data entry transactions, 24,000 policyholder online updates, 80,000 general inquiries, plus 5,000 hard copy batch document requests.

Data entry procedures, both for written forms and terminal display, are sequenced so that what appears on the terminal screen parallels the information on source documents. Compared with previous methods, this new online data entry system has reduced required keying time by 30% and operator training time by 60%. The transactions are edited as they are entered, thereby reducing the number of errors coming into batch processing by over 30%.

"Probably the best way to measure the cost effectiveness of our data processing operation is to compare the USAA underwriting expense ratio with the rest of the insurance industry," says Col. Martin Fishel, senior vice president, computer services. "Each year, USAA reports one of the lowest expense ratios in the industry. Our computer systems are a major factor in keeping these expenses down."

Bell Helicopter Gets a Lift from Computer-Aided Design

A helicopter rotor spins at 300 revolutions a minute as its turbine engine runs at 6,000 RPM. A multistage transmission, designed and manufactured by Bell Helicopter Textron, accomplishes a twentyfold reduction to provide lift for the craft. That capability alone makes it a very complex mechanism, but at Bell there is an additional requirement: the transmission must be able to run dry of oil for thirty minutes and survive.

That level of performance requires very precise design parameters. Bell's engineers have been using the Fort Worth company's IBM System/370 Model 168 to help produce reliable, cost-efficient helicopters. Much of the designing is done by engineers who interact directly with the computer via twenty-five IBM 3277 and 2741 terminals which are linked to the Model 168 under the Time Sharing Option (TSO) and OS/VS-SVS.

"With interactive computing, we've been able to increase the productivity of many engineers by a factor of four," says Joe Red, chief of scientific and technical computing. "By evaluating more options in the same time, they can minimize technical risks."

At Bell, computer-aided design is used to model everything from human factors, like legroom and headroom, to helicopter "survivability" under the most turbulent conditions. The company has developed over 500 specific application programs which run the gamut from designing the smallest gears to simulating the flight characteristics of the entire aircraft.

The computer is also used to formulate the "egg shell" configurations—the geometry of an aircraft's skin. In the manufacturing area, the computer keeps track of manpower requirements, operations plans and parts production schedules.

"Interactive computing and a comprehensive data base," says Red, "have helped us design and produce rotorcraft with the classical aerospace virtues—maximum strength, minimum weight and as much payload as possible."

The final touches are being applied to a helicopter at Bell Helicopter Textron in Fort Worth. The aircraft was designed with the help of computer simulations.

Multiprocessing Ups Availability at UOP

"With our corporate computing load increasing by 37% a year for the last several years, system availability had become critical." So says Steve Bloch, director of corporate computer services for UOP, Inc., explaining the company's recent move to an IBM multiprocessing (MP) system.

UOP, (formerly called Universal Oil Products Company) headquartered in Des Plaines, Illinois, is an engineering-oriented company which designs and builds petrochemical process and pollution control systems, and manufactures their engineered components. A major subsidiary constructs refineries. Its System/370 Model 158MP serves users in 18 divisions in the U.S. and Europe, plus several non-UOP companies.

In the multiprocessing system, two "tightly coupled" central processors back each other up to insure system availability. A single control program under the Multiple Virtual Storages (MVS) operating system automatically allocates work between the processors, dynamically assigning the load for maximum work throughput and best utilization of all resources.

"Certain of our applications—such as shop order control—are synchronized with physical operations," Bloch explains, "so computer availability is vital. That's why we wanted the backup facilities and automatic error recovery of the multiprocessing system."

In a three-shift, six-day-a-week operation, Bloch notes, the system has been available more than 99.5% of the time.

Engineering productivity is also crucially dependent on computer availability, he adds. Most of this work is unscheduled: engineers simply enter linear programs or other large-scale calculating jobs at will, via remote terminals in 22 locations.

This variability of demand was an important factor in the choice of a multiprocessing system. The UOP system solves difficult scheduling problems in sufficient time to avoid conflicts, eliminating most manual scheduling.

Engineers at Des Plaines use IBM's Time Sharing Option (TSO), which permits them to interact directly with the computer, completing their solutions while seated at visual display terminals. TSO also enables engineers to validate input data before initiating computer runs—preventing costly reruns and shortening turnaround time.

Computer applications in plant design are growing fast at UOP. This engineering model is of a new process plant.

The data processing department itself uses TSO to enter and test programs under development. In this application, Bloch asserts, TSO has increased programmer productivity by 62%.

Bloch says, "The multiprocessing system has been remarkably flexible, absorbing wide fluctuations in volume. It's given us excellent availability while responding well to our increasing demand for interactive computing."

DP Dialogue appears regularly in these pages. As its name suggests, we hope DP Dialogue will be a two-way medium for DP professionals. We'd like to hear from you. Just write: Editor, DP Dialogue, IBM Data Processing Division, White Plains, N.Y. 10604.

76-4

IBM®
Data Processing Division

Original Forms Too Complex

'Son of Hipo' Proposed As Easier Charting Vehicle

By Joseph T. Rigo

Special to Computerworld

Concepts and Techniques

Let's face it. Hierarchy plus input, processing, output (Hipo) charts are great, but they are so complicated to create and maintain that no one uses them.

Hipo charts were developed by IBM. They can be enormously helpful as tools for structured system and program design and for documentation.

They graphically display the inputs to an operation, the processing functions and the outputs. The operation can be almost anything from a computer program to a master plan for housebreaking your dog.

Hipo charts work beautifully as documentation for complex operating system programs. They work equally well as part of the functional specifications for routine commercial applications.

They can be understood by almost anybody: programmers, bank presidents and even systems analysts.

Project managers like Hipo charts. They are willing to pay any size internal billing rate to get a trained technical writer to produce them.

Everyone Likes Them

And there's the catch. Everyone likes Hipo charts – provided someone else will do the work.

The problem is that Hipo was invented to meet the needs of a complicated systems programming environment. The most complex version of Hipo is the only one available.

Hipo is cram full of symbols. It has big white arrows to show the flow of data, big black arrows to mark entry points and exits and narrow arrows for pointers and notes. It has circles and squares, big boxes, little boxes and all the standard flowcharting symbols.

A person must have a nontrivial degree of skill to draw the charts in the first place. And it takes a great deal of skilled drudgery to keep them up to date. At least one new chart has to be drawn from scratch for every significant change in specifications.

Attempts to Automate

There have been some attempts to automate the process. Clint Jurgens and Dick Olson of Sperry Univac in St. Paul described one effort at the ACM '75 conference last fall.

They modified a software package that normally produces electronic circuit diagrams. Their Hipo charts look like wiring diagrams for your television set, but they do the job, and they are easy to update.

In most places, the work must be done by hand.

The amount of required, repetitive labor is one reason Hipo is not widely used. Another is that a routine commercial application simply doesn't need all the power available with the full assortment of circles, squares, boxes and arrows.

Consider a simplified approach. Call it Son of Hipo, or Hipo Jr.

For illustration, assume a standard master file update program. On the left side of the page, put a list of inputs: the master file, a transaction file and perhaps a table of codes used in processing.

On the right, put a list of outputs: the updated master file, a couple of reports and a parameter to be passed.

Put a great big box in the middle. It is for a list of processing functions performed (or to be performed) by the module.

A simple arrow connects each input item with the first processing function that uses it. Another arrow connects a processing function with the output it creates.

Plenty of Room

There is still plenty of room on the page for miscellaneous text. The text includes identification of called and calling modules, job and procedure names and references to file and record layout forms as necessary.

Joseph Rigo, president of Sysdoc, Inc., a New York-based documentation consulting group, described the accompanying article as "sort of an answer to Ed Yourdon's piece [CW, May 31]."

The result is a programmer's version of the flowchart that is customarily produced for the data center operations staff. The main difference is it emphasizes processing functions.

The chart is easy to update. It can be maintained on a standard text editor. For best results, include it as comments in the program listing. If it is in the listing, maintenance programmers are more likely to use it and keep it up to date.

This approach has an important byproduct. It introduces everyone to the fundamentals of Hipo charts.

The arrows, boxes, squares and circles are still available. They can be added as needed when a more complex design application comes along.

In the meantime, people may start using Hipo. It really does work.

SHOPPING FOR FINANCIAL SOFTWARE?
TALK WITH THE INDUSTRY LEADER.

MSA

The more than 1700 users of our packages have made MSA the leading producer and supplier of financial accounting software systems.

Our full range of packages includes:

- General Ledger System
- Financial Information and Control System
- Payroll Accounting System
- Personnel Management and Reporting System
- ALLTAX™
- Supplies Inventory Control and Purchasing System
- Accounts Receivable System
- Accounts Payable System
- Fixed Asset/Property Accounting System

If you're shopping for financial software, you owe it to yourself and your company to talk with the industry leader. MSA.

For further information, call Bill Graves at (404) 262-2376 or mail this coupon to:

MSA

Management Science America, Inc.
3445 Peachtree Road, N.E.
Suite 1300, Dept. J1A
Atlanta, Georgia 30326

Chicago, 312-323-5940;
Los Angeles, 213-822-9766;
New York, 201-871-4700

Name__________
Company__________
Title__________
Address__________
City__________
State__________ Zip__________
Phone__________ Computer Model__________

I am interested in.
☐ General Ledger
☐ Payroll Accounting
☐ ALLTAX™
☐ Accounts Receivable
☐ Accounts Payable
☐ Financial Information and Control
☐ Personnel Management and Reporting
☐ Fixed Asset/Property Accounting
☐ Supplies Inventory Control and Purchasing

MAY WE QUOTE

PERIPHERALS ☐ COMPUTERS
COMMUNICATIONS ☐ SOFTWARE

MINI/MICRO COMPUTER
SPECIAL DEVICE OR RS232

____Tape Cartridge Unit & Systems
____Universal Printer Controllers
____Floppy Disk Controllers & Systems
____Trident Disk Controllers & Systems
____Keypunch Interfaces
____Microcomputer Prototyping Boards
____Microcomputer Hardware/Software
____Microcomputer Consulting
____Digitizing Systems & Components
____Input/Output, Storage Devices
____Special Software Packages
____Tape Drives & Interfaces
____Special Machining/Welding

WRITE: NORTHEAST SERVICES, INC.
P.O. Box 373–Wallingford, Conn. 06492
Marty Jarosz–(203) 265-1223
PRINCIPAL/LINE INQUIRIES WELCOME

DP Leaders Must Stop Fire Fighting, Start Managing

By Jack Stone

Special to Computerworld

Peopleware

A new opportunity has developed for computer center managers to impact their total organizations, not by further advances in DP systems and technology, but by leading the way toward new programs of human relations and personnel development – helping to build a new "quality of life" in American business and government organizations.

DP management today is in a rare position of gaining top management support in addressing the center's personnel situation and setting an example for the rest of the organization. And why shouldn't it be the DP manager's role?

While each article I have written thus far has discussed a selected topic related to DP human relations, they can all be summarized in a short list of major action goals center managers must embrace if they are to accept the challenge of becoming leaders of people as well as leaders of technology.

Goal 1 is an end to the disruption. There simply is no operating department in American organizations today whose day-to-day activities are so filled with turmoil and crisis as the production-oriented computer center. Although serenity seems always just around the corner, the fact remains the pace has been hectic for over a decade!

There are those who say that "fire-fighting" is the natural order of DP operations and that the effectiveness of DP systems would wither away in a sedentary climate.

However, I do not accept this thesis, simply because over the long run the disruptive environment does not permit DP personnel to complete assigned tasks to their own levels of achievement and excellence.

Turbulence in operations erodes motivation and denies full satisfaction of accomplishment; it encourages poor performance and inefficiencies. To end disruption, DP management will be required to take strong and unpopular stands with top executives.

Management may be forced to request the deferral of new hardware/software until currently installed systems are adequately debugged; the delay of new, critical applications until those currently in operation are found acceptable to users; or a substantial increase in personnel to meet existing development and production commitments.

In net, it is necessary to stop overcommitments to production, premature release of systems in development and understaffing of key projects, three of the primary causes for disruption.

More Leadership

Goal 2 is new leadership capabilities for the DP management team. Most DP managers and supervisors view their responsibilities as technical and operational in nature and give little consideration to their managerial responsibilities as professional leaders.

Many DP managers come to mind who need development in the principles of effective leadership: a simple understanding of and sensitivity to the unique human characteristics of each employee; personally conducting skills training of employees; counseling of subordinates to improve job performance; finding ways to enhance employee motivation; applying creative talents to solve personnel problems; building mutual respect and confidence through communications; or taking steps to change employee attitudes.

Readers are invited to write to Stone, c/o Computer Education International, Inc., Suite 222, 2233 Wisconsin Ave. N.W., Washington, D.C. 20007, outlining questions, issues or situations pertinent to human relations and personnel management.

Selected letters will be published in Computerworld, *along with commentary by Stone, in a column beginning shortly.*

Letters should not exceed 500 words and should include the name, title, organization and address of the sender for acknowledgement purposes. This information will be treated as confidential and withheld from publication unless authorized for release by the sender.

Superior supervisory skills are mandatory for long-term success of the center. Counseling and training in supervisory leadership are essential programs for the future.

Development Programs

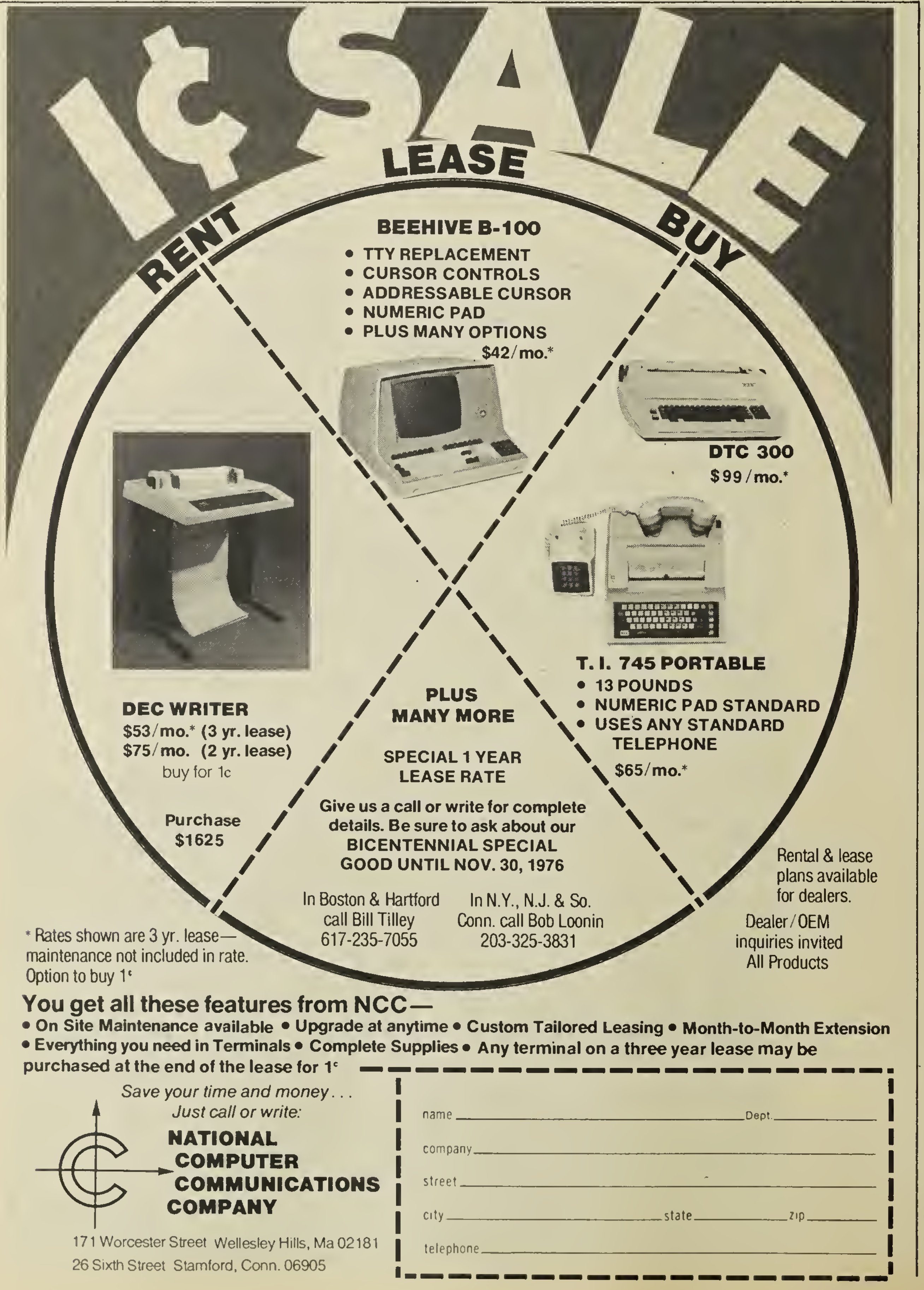
Goal 3 is an effective development program for each employee. Most DP people want to grow and produce to the maximum of their capabilities, probably more so, I believe, than any other segment of the American working population.

And why shouldn't we? Although the industry and the marketplace have enjoyed a phenomenal expansion since their beginnings, most of us believe the really serious expansion is yet to come.

Yet, the minds of the rank and file of DP personnel are filled with despair when relating to nontechnical matters of personal development, opportunity and job satisfaction. Literally everyone I have talked with has expressed serious dissatisfaction with the job, grave misgivings about management and important concerns about their organization. The levels of personal achievement have fallen well below the levels of personal aspirations, DP people feel they have worked hard to advance the capabilities of their organization through new DP systems, but that management has not responded in kind by developing plans for their career success.

Each employee seeks a roadmap for the future, based on individual career goals, with alternate pathways to higher level technical or supervisory positions. Each person needs clear statements and current information about job opportunities throughout the organization, including those outside of DP, plus experience, education and training requirements for such jobs.

Each individual wants to participate in all the training that is available, expecting the firm will either provide it in-house or pay for outside services.



BEEHIVE B-100
- TTY REPLACEMENT
- CURSOR CONTROLS
- ADDRESSABLE CURSOR
- NUMERIC PAD
- PLUS MANY OPTIONS

$42/mo.*

DTC 300
$99/mo.*

T. I. 745 PORTABLE
- 13 POUNDS
- NUMERIC PAD STANDARD
- USES ANY STANDARD TELEPHONE

$65/mo.*

DEC WRITER
$53/mo.* (3 yr. lease)
$75/mo. (2 yr. lease)
buy for 1c

Purchase
$1625

PLUS MANY MORE

SPECIAL 1 YEAR LEASE RATE

Give us a call or write for complete details. Be sure to ask about our BICENTENNIAL SPECIAL GOOD UNTIL NOV. 30, 1976

In Boston & Hartford
call Bill Tilley
617-235-7055

In N.Y., N.J. & So.
Conn. call Bob Loonin
203-325-3831

Rental & lease
plans available
for dealers.

Dealer/OEM
inquiries invited
All Products

* Rates shown are 3 yr. lease—maintenance not included in rate. Option to buy 1¢

You get all these features from NCC—
- On Site Maintenance available
- Upgrade at anytime
- Custom Tailored Leasing
- Month-to-Month Extension
- Everything you need in Terminals
- Complete Supplies
- Any terminal on a three year lease may be purchased at the end of the lease for 1¢

Save your time and money . . .
Just call or write:

NATIONAL COMPUTER COMMUNICATIONS COMPANY

171 Worcester Street Wellesley Hills, Ma 02181
26 Sixth Street Stamford, Conn. 06905

name ________________ Dept. ________
company ________________
street ________________
city ________ state ________ zip ________
telephone ________________

Equipment Compatible With SDLC

Adoption of ADCCP Expected to Spark New Terminals

By Ronald A. Frank
Of the CW Staff

WASHINGTON, D.C. – When the Advanced Data Communications Control Procedure (ADCCP) is finalized by the American National Standards Institute (Ansi) as a U.S. data link control protocol, it will probably trigger the introduction of compatible terminal equipment.

The ADCCP standard has been under consideration by Ansi for several years. Originally it was an IBM concept, but IBM has now backed Synchronous Data Link Control (SDLC), so ADCCP is expected to become the link control protocol used by non-IBM terminal suppliers.

At least three major DP suppliers – Burroughs, Control Data Corp. and Univac – are known to be developing terminal equipment compatible with ADCCP in its present format. Digital Equipment Corp. has a bit-oriented protocol that is similar to ADCCP.

The relationship between IBM SDLC equipment and ADCCP equipment is not yet clear, but in general the ADCCP terminals will probably operate without major problems within an SDLC environment.

On the other hand, the SDLC equipment may not be totally compatible with ADCCP nets, according to Gerald Shutz, chairman of the Ansi X3S3 subcommittee that is working to bring in a final ADCCP standard.

Shutz described the relationship of ADCCP and SDLC as being similar to the relationship of a station wagon and a car – the station wagon can do everything the car can do, but the car can't do everything the station wagon can do, he explained.

Even though several vendors apparently are planning to introduce ADCCP terminals, the standard is not yet finalized. Standards efforts proceed slowly, and Shutz said a final ADCCP standard could still be as much as a year away.

Goes Further Than HDLC

The standards efforts on ADCCP go far beyond SDLC, however. In fact, ADCCP goes further than the Higher Level Data Link Control (HDLC) proposal of the International Standards Organization (ISO).

The significance of HDLC is that it is close to the X-25 standard proposal currently being implemented in several international packet-switched networks, including the U.S. Telenet system and the Canadian Datapac.

The X-25 proposal now has the status of a CCITT recommendation, and HDLC answers parts of the X-25 proposal that have not yet been resolved, a standards expert said. CCITT will probably meet early in 1977 to come up with a more definitive version of X-25.

There is "almost compatibility between them all unless something goes wrong," Shutz said. A user operating with an ADCCP terminal will probably be able to interface with networks that utilize an X-25 protocol, but even this is not totally certain because there is no ACDDP terminal yet available.

The Burroughs Data Link Control (BDLC) is presently one of the data link control procedures closest to ADCCP in its current form. BDLC "follows ADCCP," according to the standards source.

A number of non-IBM terminal suppliers are waiting to introduce terminals when ADCCP reaches a final form. These ADCCP devices are expected to have a higher level capability than IBM SDLC terminals.

'Cast in Concrete'

At present the X3S3 committee is balloting on ADCCP. Once this step is completed, the standard will be considered by the Ansi X3 committee.

After X3, the Board of Standards Review gets to consider ADCCP; the standard will then be published.

But users may not have to wait quite that long. If X3 gives its approval, the standard "is pretty much cast in concrete" and vendors will probably begin to introduce their ADCCP terminals. All that vendors would have to do at that point to meet the ADCCP protocol would be to add some software or firmware to their equipment designs.

And most of the network carriers, including those with packet-switched networks, intend to interface with ADCCP equipment. For users, the data link protocols are slowly evolving into standards; once that happens, terminals will follow.

Portable Units Increase Salesmen's Selling Time

CHICAGO – Salesmen for a tobacco and confectionery distributor located in nearby Countryside are reportedly gaining extra hours of selling time by employing electronic ordering terminals to write and transmit their daily orders.

The terminals allow S. Bloom's salespeople to bypass the paperwork and driving time previously necessary to get their daily orders to the warehouse by a 6 p.m. deadline, according to Steve Bloom, the firm's vice-president.

S. Bloom's salespeople are using terminals to enter their orders instead of driving back to the warehouse each evening to deliver them.

The company is using Source 2100 data entry terminals from MSI Data Corp. "The most significant advantage of the MSI electronic ordering system is that our field salesmen now have the additional time to sell our merchandise," Bloom said.

Bloom wholesales and distributes tobacco products, smokers' aids and candy items to approximately 2,200 retailers in the metropolitan Chicago area. The competitive nature of this type of distribution industry demands overnight processing and next-day delivery of all orders, Bloom noted.

Bloom's salespeople carry the unit into the field with them and either key in the order data at the retail store or directly after the visit while sitting in their cars.

Most salemen telephone the recorded order information to Bloom's DP center twice a day via the Source 2100 terminals to an MSI Systems IV receiver with one receiving line. The data receiver can be equipped with four or more lines if necessary.

An entire salesman's order can be transmitted at 120 char./sec to the receiver over ordinary telephone lines in a call which normally takes less than two minutes. Bloom salesmen used to spend hours on the highways each evening driving to the warehouse to deliver their orders, Bloom said.

The System IV receiver automatically verifies all incoming orders. When recorded on the receiver's magnetic tape, the data is ready for direct input into the company's IBM 3/10 system.

Order information is fed into the computer for processing by 8 p.m. the same evening. Complete invoicing and picking documents are then printed, and the warehouse can begin picking the orders by 10 p.m. By 6 a.m., Bloom's delivery trucks can begin their routes.

Salesmen are now carrying an order list which describes the company's entire product line. This list replaced mark-sensitive coding forms which carried only 60% of Bloom's product line.

Bloom expects to see a dramatic increase in line volume as a result of the system. "I expect with time the increase can easily reach 5%, which will be a substantial volume increase," he said.

IBM Terminal Has Multileaving

WHITE PLAINS, N.Y. – IBM has introduced a version of the 3777 remote job entry (RJE) terminal that includes a binary synchronous multileaving capability and a 1K-character gas panel display.

Designated the 3777 Model 2, the terminal can operate at speeds up to 9,600 bit/sec, print at speeds up to 1,000 line/min and read cards up to 400 card/min, IBM said.

The binary synchronous multileaving gives users the ability to include in one transmission block the data that can be sent to more than one I/O device; this is accomplished by including various control blocks within a transmission block, IBM explained.

The multileaving feature is generated at the host mainframe, which produces a terminal object card deck. This deck is then loaded into the Model 2. The multileaving was previously used by IBM on the 360/20 Submodel 5 workstation.

The multileaving runs with ASP, JES2, JES3 and RSCS and with the VS1, VS2 and VM/370 operating systems, IBM said.

A typical 3777 Model 2 with 3202 Model 3 printer, 400 card/min reader, gas panel display and required attachments costs $1,682/mo under the 24-month Extended Term Plan (ETP). Standard under the Monthly Availability Charge (MAC) is $1,927/mo and the purchase price is $65,385.

The gas panel display is an optional item priced at $90/mo ETP, $106/mo MAC and $3,600 purchase; the multileaving is a no-charge item. First deliveries are scheduled for the first quarter of 1977.

Let's talk about a brand new Terminal

Here it is! The *new* AJ 832. This new printer terminal combines high speed with versatility, reliability, and operating convenience. There are plenty of features as well, for example:

- A 256-character buffer memory
- ASCII, EBCD, and Correspondence Codes in one
- 30 or 45 cps throughput
- 17 key numeric pad with programmable function keys
- High speed plotting and plotting software, too
- APL keyboard

There are many options available too, such as pin feed platen or forms tractor, side shelves, and fan-fold paper trays.

We have a nationwide sales and service organization to stand behind every new AJ 832, and you have the choice of purchase or lease (month-to-month if you wish).

We'd like to talk about everything this new AJ 832 has to offer. We'll start by sending you our brochure. Just fill in the coupon or give us a call direct.

Marketing, Dept., Anderson Jacobson, Inc.
1065 Morse Ave., Sunnyvale, CA 94086

I would like to know more about the NEW AJ 832.
☐ Please send me your brochure
☐ Have someone contact me

NAME__________
COMPANY__________
ADDRESS__________
CITY______ STATE______ ZIP______
TELEPHONE__________
CW 8/9

ANDERSON JACOBSON

1065 Morse Avenue · Sunnyvale, CA 94086 · (408) 734 4030

DEC Unveils Interface Series

MAYNARD, Mass. – Digital Equipment Corp. has introduced a series of communication interfaces for its PDP-11 systems.

There are three units in the series: a single-line high-speed synchronous interface called the DMC11, a single-line multiprotocol synchronous interface called the DUP11 and a low-cost asynchronous 8- and 16-line multiplexer called the DZ11, DEC said.

The DMC11 is designed for high-speed links between PDP-11s using the DEC Digital Data Communication Message Protocol (DDCMP). The DDCMP functions are implemented in hardware through use of a high-speed microprocessor

This arrangement permits high-speed operation (56 kbit/sec or 1M bit/sec) over coaxial cable between CPUs located in the same facility, according to DEC. For operation over common carrier facilities, the DMC11s can be interfaced to synchronous modems at data transmission rates up to 19.2 kbit/sec.

The DUP11 is described as the first of a series of communication interfaces with multiprotocol capabilities. It is capable of handling bit-stuffing protocols such as Synchronous Data Link Control (SDLC) and Higher Level Data Link Control (HDLC).

The DZ11 multiplexer interfaces 8 or 16 local or remote asynchronous terminals or modems to PDP-11 systems.

The DMC11 high-speed synchronous interface is priced from $2,145, with deliveries scheduled for September. The DZ11 multiplexer is priced at $2,100 for an 8-line version and $3,400 for a 16-line version; deliveries are scheduled to begin by the end of July. The DUP11 multiprotocol interface is priced at $1,375.

Data Entry Units Serve as Core Of Retailer Inventory Service

LOS ANGELES – A large computer service bureau based here provides specialty retail store chains a retail inventory management service which depend on data entry terminals for input of daily sales transactions.

"We've developed a highly sophisticated system that tells retail store management everything about the movement of store stock," according to Bob Yauney, Retail Division manager at Silton Data.

"A simple eight-digit code describes every piece of merchandise in inventory. This code number allows our computer to follow the movement of each individual garment from the time of wholesale purchase up to the time it is bought by the consumer."

Silton's retail chain clients receive computerized reports that analyze every aspect of their retail operations from merchandise movement to salesperson performance.

The company's Retail Inventory Management System (Rims) enables retailers to eliminate out-of-stocks, optimize store inventory for turns, reduce marked-down merchandise and alleviate the problems of slow movers occupying too much of store display space.

By numerically labeling specially printed pricing tags with the code number – which describes the garment by manufacturer, style, size and color – Silton's Burroughs Corp. B4700 CPU can chart the movement of each individual piece of merchandise on a daily basis.

Helps Spot 'Movers'

Turning merchandise is crucial to the retail garment business. Maintaining a fluid inventory maximizes margin of profit and brings a favorable return on investment. Slow movers, on the other hand, are dead money – and usually these items get unloaded at marked-down prices to clear floor space for new merchandise.

Computerized reports help management spot "movers" in time to get reorders in and have them delivered to turn more merchandise. The reports pinpoint good and bad turn covers.

Checking vendor performance is also a useful feature of the reports. If a certain product line accounts for 5% of a retailer's sales, but represents 30% of his inventory, the retailer can adjust his purchasing decision to fall more in line with his sales.

Silton Data decided to complement its inventory reporting system with MSI Data Corp. Source 1100 data terminals because most specialty retail chains aren't in an environment suited to more expensive point-of-sale (POS) cash register terminals, Yauney said.

Unlike large department stores with 50 or more cash registers in each store, the average specialty retail store is a one-register environment, he explained.

Additionally, the length of time usually required to make a sales transaction at a POS register is eliminated by using the data terminal system, Yauney said.

"With the terminal in the store, the manager can enter his sales data at any time simply by keeping a portion of the sales tag at the time of the sale. He is not restricted to inputting data at the time of the sale," he said.

At the time of sale, the salesperson removes a portion of the garment tag with the numeric identification code and a space for sales identification number, which is recorded for commission purposes and analysis of sales performance.

At the end of each sales day, the manager or assistant enters the information on the sales tag and transmits it to Silton's DP center.

Device Switches Modems To Either of Two Channels

PROVIDENCE, R.I. – International Data Sciences, Inc. (IDS) has introduced the Model 8506-D selector switch packaged in desktop configuration.

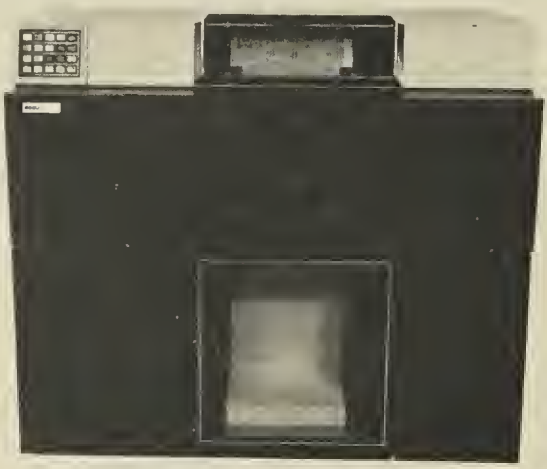
The 8506-D is used to switch the 25-pin EIA RS-232 or CCITT V.24 interface to either of two outputs.

Utilizing the 8506-D, one modem may be switched to either of two front-end-processor data channels or to either of two data terminals. The unit may be used to switch a data channel from an on-line modem to a backup modem or for switching from a leased line modem to dial backup.

The switch costs $105 and delivery is 30 days from IDS at 100 Nashua St., Providence, R.I. 02904.

DOCUMATION'S PRINTER/READER/PUNCH: YOUR IBM 360/370 WILL THINK IT'S IBM. THE PRICE PERFORMANCE RATIO WILL TELL YOU IT'S DOCUMATION.

Documation just introduced a new Printer/Reader/Punch Subsystem you should introduce to your IBM System 360.



DOC 2250 OR DOC 1800

When you replace your IBM 2540 Reader Punch and IBM 1403 Printer or 3211 with Documation's new Printer/Reader/Punch Subsystem, your main frame won't notice the difference.

But, there are some very significant differences you will notice.

You can take your choice of two printer models — our DOC 2250 (printing 2250 lpm with a 48 character set) or our DOC 1800 (printing 1800 lpm). With some extra advantages thrown in.

Operating in the 3211 mode, the DOC 2250 prints 10% faster than the 3211. The DOC 2250 costs less than half as much as the 3211. The DOC 2250's integrated microprocessor controller eliminates the need for a separate controller. And because the DOC 2250 has built-in, comprehensive microdiagnostics, maintenance can be done off-line without tying up the host system.

The DOC 2250 also offers: buffered vertical format control; fully-buffered print line; operator-changeable character arrays; Universal Character Set Buffer (UCSB); up to 6-part forms; paper slew up to 100 inches per second; power cover; power stacker.

The DOC 1800 offers all the features of the DOC 2250, but at a reduced printing speed. And a reduced price.

The 1403 compatibility feature allows both models to operate in the 1403 mode. Your CPU will think it's working with a 1403. You'll know you're getting a 2250 or 1800 lpm printer for just about the cost of an 1100 lpm printer.

The read/punch side of the Subsystem (the DOC PC 6000 Reader and the DOC PC 50 Punch) recognizes the same command set as the IBM 2540. All data and control signals transferred between the host and the PC 50 and PC 6000 pass through a subsystem microprocessor controller built into the PC 6000. Utilizing Documation's own patented riffle-air pick and stack system, the PC 6000 reads 1000 cards per minute and stacks them in one of two stackers. Options include 51 Column Card Read and Optical Mark Read.

The PC 50 Punch Model 3 nominally punches 50 cards per minute; Model 4 punches 100 cpm. The PC 50's microprocessor controller enables it to detect and correct punch errors automatically without operator or host system intervention. With the Pre-Read feature Model 3 reads 300 cards per minute, Model 4 reads 400 cards per minute. Other PC 50 options include a 51 Column Card read/punch feature, an interpret feature, a second input hopper to enable off-line reproduction of card decks; a Read Column Eliminate feature and Optical Mark Read. Off-line, the PC 50 will gang-punch, reproduce and interpret, eliminating the need for extra pieces of equipment.

The ruggedness and reliability of Documation equipment in the field is legendary. Documation equipment has proven itself so reliable in fact, that card-handling equipment users ranked Documation their #1 preference in 1975 media surveys. All Documation products are designed in-house. Then all parts and machines are fabricated in our own sophisticated precision manufacturing facility, giving Documation a unique control over product quality and reliability.

DOC PC 50

DOC PC 6000

Documation provides sales and service in major metropolitan areas. Documation's service is as reliable as Documation's equipment. Documation's maintenance contract provides service 24 hours a day, 7 days a week.

You have an IBM 360 or 370. We have the Printer/Reader/Punch that offers the most cost-efficient subsystem available. For more details, call or write Mr. Roy Ostrander, V. P., Box 1240, Melbourne, Florida 32901. Phone (305) 724-1111.

For sales and service in metro areas, call:
New York (203) 869-4123; Chicago (312) 884-7308;
Los Angeles (714) 752-8782.

DOCUMATION
INCORPORATED

Under FBI Contract

Calspan Makes Fingerprint Matching a Hardware Job

By Nancy French

Of the CW Staff

BUFFALO, N.Y. – Law enforcement came one step closer to reading, classifying and matching fingerprints automatically with a new piece of classification hardware demonstrated by Calspan Technology Products, Inc. here recently.

Under a contract from the Federal Bureau of Investigation (FBI), Calspan has speeded the classification process previously performed by software by making it a hardware function, according to John Jones, a spokesman for the FBI's Identification Division.

The new product, which classifies fingerprint cards at about 600 card/hour, is known as Fingerprint Classifier System (Fics).

Fingerprints are classified and matched according to two general characteristics: ridge directional flow and the location of and relationship between the print's minutiae, according to Jones.

But before a fingerprint can be classified by Fics, it must be read and registered, Jones explained. With hardware already developed by Calspan and manufactured by Rockwell International, Inc.'s Autonetics Division, a print can be read using a flying spot scanner and system that digitizes the ridge directional flow and minutiae locations.

Fics then classifies each fingerprint according to one of the 116 classifications established by the FBI's National Crime Information Center.

Fics then makes an overall numerical classification for the fingerprint card by designating the particular combination of classifications for the 10 individual prints on the card, Calspan said, and the print is stored in a data base.

Search and Matching Software

To match a new print against those already on file, the system reads and classifies the new print and then matches it against the data base using search and matching software also available from Calspan, Jones said. Thus the print need be searched only against those prints whose classification numbers indicate general similarity, Jones said.

While the prototypes of the Finder hardware still being tested by the FBI were built and delivered by Calspan in 1972, five production models were built for further testing by Rockwell International under a separate contract, Jones said.

By changing the card handler from a semiautomatic to an automatic model, the FBI-Rockwell production models work about three times faster than the prototype, Jones said.

Although the major difficulties of automated fingerprint identification have been overcome, the FBI is still testing and does not anticipate converting to an automated identification system before 1981 or '82, Jones said.

At present the FBI's fingerprint file contains 21.4 million fingerprint cards for individuals under the age of 80, Jones said. FBI officials do not intend to convert all these cards; plans call for reading and digitizing only those of individuals under 55 years of age, according to Jones, thus reducing the number that must be converted to 14 million.

Calspan Engineer Thomas L. Leising operates the firm's automatic Fingerprint Classifier System (Fics). After the print is read and digitized by a companion unit previously introduced by the firm, Fics locates the minutiae shown on the monitor and then assigns the print to one of 116 federal classifications for storage in a data bank.

"Hopefully we'll have a portion of the system up and running in about 1978," he estimated.

Although the FBI program is moving slowly, Calspan is forging ahead with a somewhat different system for large cities and state identifications bureaus that is said to be able to match latent fingerprints – those obtained from the scene of a crime.

Unlike the system designed for the FBI, Calspan's slower, smaller scale matcher does not require alignment of the two fingerprints being matched.

To match a fingerprint lifted from the scene of a crime, the Fingermatch system puts the latent print on a CRT screen where a technician traces the minutiae on the screen with a light pen.

This procedure takes from four to six minutes, a Calspan spokesman said, but once the print is drawn and coded, Fingermatch compares the new print against 10,000 prints – or 1,000 sets of 10 fingers each – in one minute, he said.

Since a city police department may have only 5,000 to 10,000 prints in its data bank, the print can be matched in a minute or two, he indicated.

The lifter portion of the system, consisting of the screen, light pen and a small processor, sells for $21,900. The search/match portion of the system is priced at $119,700, Calspan said.

In the Used Market—Part 2

Maintenance an Important Factor

By Sonny Monosson

Special to Computerworld

One of the most important factors a user must consider in a used computer transaction is the status of maintenance on the equipment slated for sale.

Self-maintenance is a rarity in computer usage.

Although maintenance alternatives are available from independent sources, the vast majority of computer users (except in the case of minicomputers) rely totally upon those services supplied by the original manufacturer and delivered under the terms of the standard, full-coverage maintenance agreement.

The manufacturer's common practice is to offer the maintenance agreement in support of the equipment itself, as opposed to support of the customer. The maintenance agreement is normally interpreted as being automatically extended to any subsequent owner, but must nevertheless be verified as a condition of sale.

Absolute Necessity

To date, transference of the maintenance agreement is an absolute necessity for purchase, and equipment offered for sale should be warranted for acceptance under a standard maintenance agreement.

The only way such a warranty may be obtained is to request it from the original supplier. The seller should request an inspection for resale purposes and a written statement from a responsible source (for example a branch manager or customer engineer) that such equipment is validated for continuance under a normal maintenance agreement in areas where maintenance service is otherwise supplied by the manufacturer.

The machine involved should be further certified as to the operability of all installed options (which may or may not be currently used) and the installation of all engineering change orders of a mandatory character normally provided as a portion of the maintenance agreement.

Reconditioning Needed?

Since reconditioning is not generally required (except for a few vendors) as a condition of maintenance continuity, the

(Continued on Page 28)

Forms Stacker Ends Bank Delays

NEW YORK – A forms-stacker device is easing the pressure on the DP section of Bankers Trust Co. here to get the checks that are deposited each day, along with their reconciled printout listings, to the New York Federal Reserve Bank by its deadline.

Bankers Trust must float, or cover out of its own funds, checks its customers draw against checks deposited from other banks until those checks have been deposited in the Federal Reserve.

"The object is to keep the float as low as possible. If we miss those deadlines because listings aren't available or the computer breaks down that's avoidable float. The extent to which float can be avoided is what the management of the section is graded on," according to Mike Menditto, the bank's check processing manager.

In July 1974, when the bank moved its operations center (through which all checks are processed) to a new installation and installed five Burroughs Corp. 9243 1100 line/min printers, a problem developed that threatened to cancel out much of the benefit of the new installation.

The new printers' higher speed, combined with the already high skip rates inherent in printing the check reconcilement listings, was causing the continuous fan-fold forms used to tangle and misfold. Delays were being caused in processing check listings and were particularly severe during critical peak periods.

Operators were spending 10 to 15 minutes per hour just folding and reorganizing the listing stacks as they came off the printer, Menditto said.

Installed Forms Checker

To solve the problem, Bankers Trust installed an adjustable Formstacker – a power-drive forms puller and stacker from Advanced Terminals, Inc. It installed one on a two-month trial basis and

(Continued on Page 28)

Test your information display I.Q.

Q. Being pressured to exercise your purchase option credits, but want better equipment?

A. Call Courier—The Alternative.

Please complete the coupon or attach your business card and mail

I'm interested in learning more.

Name________________Title______
Company______________________
Address______________________
________________Telephone________

Courier Terminal Systems, Inc.

2202 East University Drive R15
Phoenix, Arizona 85034
(602) 244-1392

We have the answer.
DOMESTIC/INTERNATIONAL/OEM

Imagine a microcomputer

Imagine a microcomputer with all the design savvy, ruggedness, and sophistication of the best minicomputers.

Imagine a microcomputer supported by dozens of interface, memory, and processor option boards. One that can be interfaced to an indefinite number of peripheral devices including dual floppy discs, CRT's, line printers, cassette recorders, video displays, paper tape readers, teleprinters, plotters, and custom devices.

Imagine a microcomputer supported by extensive software including Extended BASIC, Disk BASIC, DOS and a complete library of business, developmental, and industrial programs.

Imagine a microcomputer that will do everything a mini will do, only at a fraction of the cost.

You are imagining the Altair™ 8800b. The Altair 8800b is here today, and it may very well be the mainframe of the 70's.

The Altair 8800b is a second generation design of the most popular microcomputer in the field, the Altair 8800. Built around the 8800A microprocessor, the Altair 8800b is an open ended machine that is compatible with all Altair 8800 hardware and software. It can be configured to match most any system need.

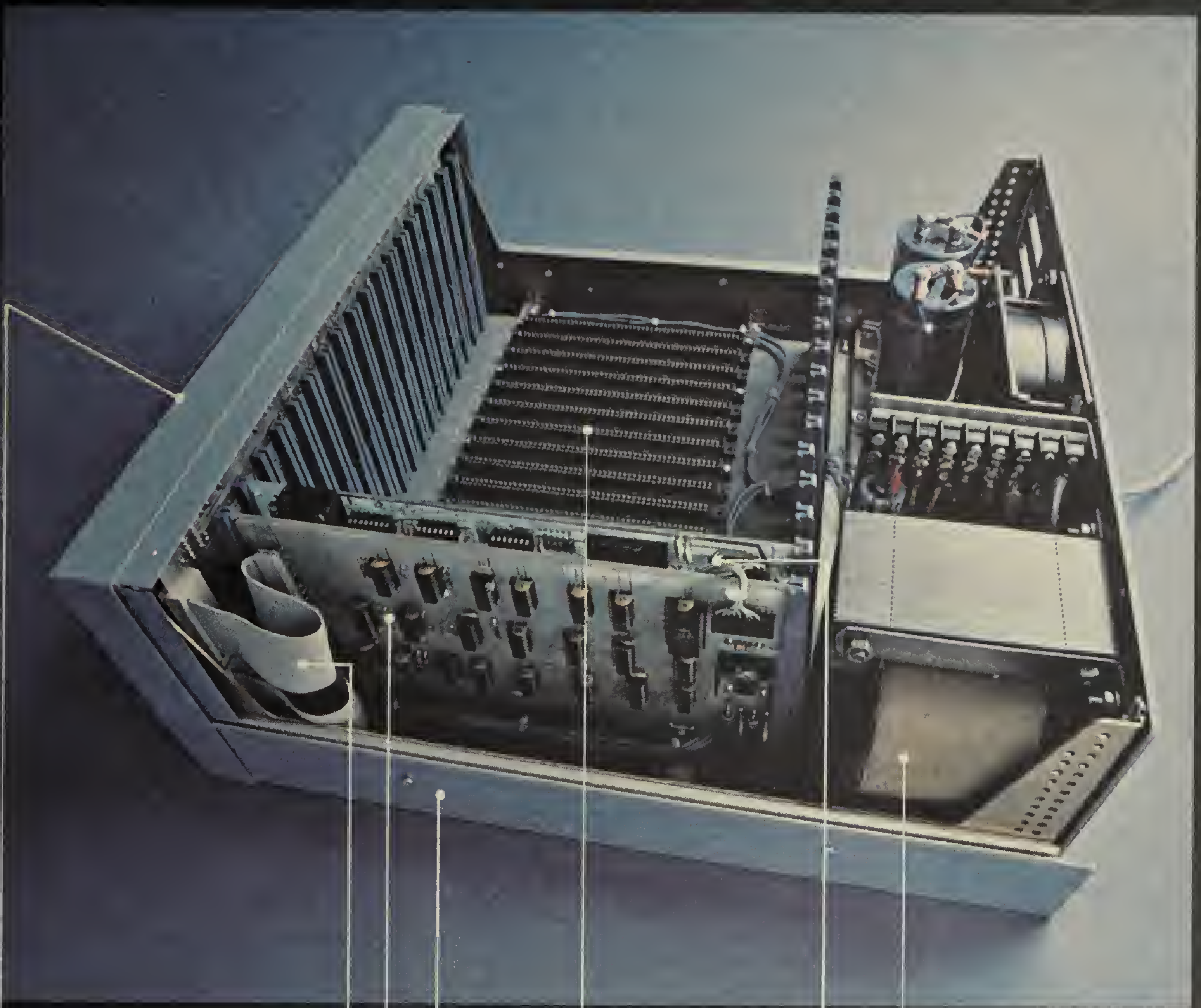
MITS' plug-in compatible boards for the Altair 8800b now include: 4K static memory, 4K dynamic memory, 16K static memory, multi-port serial interface, multi-port parallel interface, audio cassette record interface, vectored interrupt, real time clock, PROM board, multiplexer, A/D convertor, extender card, disc controller, and line printer interface.

MITS' peripherals for the Altair 8800b include the Altair Floppy Disc, Altair Line Printer, teletypewriters, and the soon-to-be-announced Altair CRT terminal.

Introductory prices for the Altair 8800b are $840 for a kit with complete assembly instructions, and $1100 for an assembled unit. Complete documentation, membership into the Altair Users Club, subscription to "Computer Notes," access to the Altair Software Library, and a copy of Charles J. Sippl's Microcomputer Dictionary are included. BankAmericard or Master Charge accepted for mail order sales. Include $8 for postage and handling.

Shouldn't you know more about the Altair 8800b? Send for our free Altair Information Package, or contact one of our many retail Altair Computer Centers.

MITS, Inc. 1976/2450 Alamo S.E./Albuquerque, New Mexico 87106



Redesigned front panel. Totally synchronous logic design. Same switch and LED arrangement as original Altair 8800. New back-lit Duralith (laminated plastic and mylar, bonded to aluminum) dress panel with multi-color graphics. New longer, flat toggle switches. Five new functions stored on front panel PROM including: DISPLAY ACCUMULATOR (displays contents of accumulator), LOAD ACCUMULATOR (loads contents of the 8 data switches (A7-AO) into accumulator), OUTPUT ACCUMULATOR (Outputs contents of accumulator to I/O device addressed by the upper 8 address switches), INPUT ACCUMULATOR (inputs to the accumulator from the I/O device), and SLOW (causes program execution at a rate of about 5 cycles per second—for program debugging).

Full 18 slot motherboard.

Rugged, commercial grade Optima cabinet.

New front panel interface board buffers all lines to and from 8800b bus.

Two, 34 conductor ribbon cable assemblies. Connects front panel board to front panel interface board. Eliminates need for complicated front panel/bus wiring.

New, heavy duty power supply +8 volts at 18 amps, +18 volts at 2 amps, 18 volts at 2 amps. 110 volt or 220 volt operation (50/60 Hz). Primary tapped for either high or low line operation.

New CPU board with 8080A microprocessor and Intel 8224 clock generator and 8216 bus drivers. Clock pulse widths and phasing as well as frequency are crystal controlled. Compatible with all current Altair 8800 software and hardware.

altair 8800-b

mits

Price, specifications subject to change. Please allow up to 60 days for delivery.

Interface Bows

ALTADENA, Calif. – The Kennedy Co. Model 1629 half-duplex interface is said to provide complete operational control without mainframe processing between Kennedy buffered tape systems or any RS-232C-compatible terminals and buffered transports.

The system allows off-line key-to-tape or tape-to-tape conversions via hardwires or telephone lines with modems at rates from 110 bit/sec to 19.2 bit/sec, the firm said.

Three transport/controller configurations accommodate varying remote collection requirements.

Tape speeds range from 10- to 125 in./sec, with 9-track data densities of 800- and 1,600 char./sec. Seven-track densities are 200-, 556- and 800 char./sec.

The Model 1629 is priced at $1,650 with volume discounts available from the firm at 540 West Woodbury Rd., Altadena, Calif. 91001.

Maintenance Important in Used Mart

(Continued from Page 25)

process may stop at this point. However, the seller should also solicit an estimate of reconditioning or refurbishing costs, in case the buyer is interested in this type of information.

The seller also should request an itemization of specific work required to bring the machine to the level of acceptability required by the maintenance agreement.

Reconditioning is not normally done prior to sale, except by equipment dealers, but is done, where required, at some point in the transfer from currently operative installation to a new user's installation.

The most convenient reconditioning services are those supplied by the original manufacturer, but several competitive reconditioning centers are now operated by independents.

The buyer sometimes opts for reconditioning, but the bulk of observed equipment transfers supported by the continuing maintenance agreement have occurred without it.

Where no significant overhaul is required, reconditioning sometimes occurs for purely cosmetic purposes. This is often a good time for factory (or field) installation of options and/or features desired by the new user.

Where the seller is not a current subscriber to his supplier's maintenance agreement, the situation is somewhat different, although the procedure is essentially the same. The same manufacturer contact should be made for purposes of obtaining an estimate for placing the equipment under a maintenance agreement.

The seller should likewise expect the estimate will be reasonably supplied by a reputable manufacturer who is potentially interested in future service revenues as well.

Should the hardware be deemed not acceptable for a future maintenance agreement or require very costly rework, the seller should solicit a detailed itemization of all work required for submission to an independent maintenance or reconditioning organization.

In summary, the seller must normally warrant to the buyer that the equipment is certified as eligible for a resumption of the manufacturer's maintenance agreement.

This generally poses no problem, since the only known cases where maintenance has been refused involve equipment for which maintenance services have already been expressly discontinued (a relatively rare phenomenon in the computer industry).

Every computer vendor treats maintenance continuity differently, and those who buy and sell used computer equipment should never assume a common industry practice exists – because in maintenance it doesn't.

Part III will discuss the methods a user has available to him to sell his equipment.

Monosson is a past president and now chairman of the Computer Dealers Association and is president of American Used Computer Corp.

Forms-Stacker Device Stops Bank Delays

(Continued from Page 25)

now has four.

"Its amazing so simple a piece of equipment could handle a problem that was driving us all up the wall," one operator said.

Formstacker operates by enabling forms leaving the printer to stack into a wire tray that lowers automatically as the forms fold in. A set of power rollers pulls the forms down through the upper part of the stacker, preventing printer jams, while rubber-covered "fingers" suspended by chains prevent the forms from billowing.

When forms reach a certain height, the next fan-fold in line trips a limit switch that indexes the tray downward. Thus, printout forms always stack at the same height level.

Automatic Alarm

An automatic alarm sounds when the tray is full and its open-sided design allows the operator to remove the printed stack from any of three sides. The unit can be moved from one printer to another to accommodate peak loads.

The key advantage of the four $1,000 units has been the ability to fully utilize the speed of its new printers in meeting check processing deadlines and cutting float to a minimum, Menditto said. Documenting time savings, operators claim operation of the four printers equipped with Formstackers is speeded by 20% at peak periods because of the elimination of misfolds and paper tangles.

The Formstacker units were also selected for their ability to cope with 1,800 line/min printer currently under consideration by the bank.

"If and when we go to an even higher speed printout operation, I have no doubt our Formstacker units will handle the load efficiently, Menditto said.

MDS Users Form in Capitol

WASHINGTON. D.C. – An independent society of Mohawk Data Sciences Corp. (MDS) users has been formed in the Capitol area to exchange hardware/software techniques and ideas on how to exploit the full capabilities of MDS systems.

Information on the Mohawk Users Group (MUG) is available from Barnett, U.S. Erda, Mail Stop CA 145, Washington, D.C. 20545.

Our 3270 replacement: It's more than you bargained for.

A 45% cost saving is a bargain. But Computer Optics offers more. The CO:77 display terminal is a totally compatible replacement for your IBM 3270. And it offers a range of design features that you can't get from IBM. At any price.

Large 15-inch display with a non-glare screen and a constant display of all system functions. It's designed to ensure viewing ease.

Touch sensitive keyboard lets operator feel each keystroke, and helps reduce errors.

Fast 60-cycle refresh rate for a sharper, steadier image and reduced operator fatigue.

Moveable display housing that tilts to the individual operator's best viewing angle. It means increased comfort for the operator and increased productivity for you.

Computer Optics Inc.
Berkshire Industrial Park, Bethel, CT 06801
Toll free: 800-243-1314 In Connecticut call collect (203) 744-6720

Mini Bits

IEEE/CS Seeking Papers For November Symposium

TORONTO – A call for papers covering all aspects of minicomputers and microcomputers and their applications has been issued by the IEEE Computer Society (IEEE/CS).

The papers will be presented at a symposium here November 10-11.

A 200- to 250-word abstract should be submitted by September 1 to the symposium chairman. More information is available from Mini and Microcomputers, P.O. Box 3243, Station B, Calgary, Alberta, Ca. T2M 418.

Floating-Point Unit Fits 8080s

BERKELEY, Calif. – North Star Computers, Inc. has a floating-point arithmetic unit for Intel 8080-type microcomputer systems.

Consisting of a single printed circuit card, the unit performs add, subtract, multiply and divide on BCD-format floating-point values, with up to 14-digit precision under program control, the firm said.

The system costs $499 from the firm at P.O. Box 4672, Berkeley, Calif. 94704.

Cache Memory Works With PDP-11s

ST. PAUL, Minn. – The Minntronics Co., Inc. Model 45 cache memory was designed to be used with Digital Equipment Corp. PDP-11/45 and 11/50 minicomputers, according to the vendor.

The unit consists of three printed circuit boards and an optional power supply that plugs into available DEC Fastbus slots.

The Model 45 feaures an on-line switch as an aid in running benchmark tests as well as hardware checkout, Minntronics said, adding installation of the memory takes about 20 minutes.

The system is priced at $6,940 for a limited time. Minntronics is at 2975 Furness St., St. Paul, Minn. 55109.

HP Triples I/O Channels of 9825

PALO ALTO, Calif. – An I/O expander that triples the number of I/O channels available for the HP 9825 programmable calculator from three to nine has been introduced by the Hewlett-Packard Co. (HP).

The 9878A I/O expander has seven I/O slots and comes with a 6-ft. cable with an integral I/O card to plug into one of the three 9825 I/O slots.

Two of the expanders may be plugged into a calculator at once, the firm said.

The expander costs $1,200 from HP at 1501 Page Mill Road, Palo Alto, Calif. 94304.

Captures 'Original Keystroke'

Newspaper System Saving $628,000

By Esther Surden
Of the CW Staff

RALEIGH, N.C. – Two newspapers here said they have some news of their own to report: a minicomputer-based system is saving them more than $628,000 annually in operating costs.

"Our objective was to capture the original keystroke," Frank A. Daniels Jr., president of the News and Observer Publishing Co., said of the system which handles and stores all copy from its origin to final phototypesetting at the *News and Observer* and *The Raleigh Times*.

The company investigated several systems before choosing a Digital Equipment Corp. mini-based configuration because it was the "most flexible system available at the time we were looking," Daniels said.

Systems Functioning

The system "has been in-house for three years and functioning the way we want it to function for six or seven months," he added.

Fifty CRT terminals serve both of the newsrooms for local copy entry, editing and headline writing; eight more are used to set classified display advertising copy. Wire copy is also captured and joins the stream of jobs for editing and output.

So far the company has invested $1.2 million in equipment for editorial and typesetting functions. About $200,000 was spent for cold-type conversion and about $800,000 went for a DEC Typeset-11 system.

The Typeset-11 includes a PDP-11/45 CPU with 128K of main memory, magnetic tape, two 44M-byte disks, two line printers, interfaces for the wire services and 16 terminal subsystems.

The remaining $200,000 was invested in a PDP-11/45 for the business office. This machine can also act as a backup for the Typeset system.

It doesn't seem as though there is "ever a stop to it," Daniels said, referring to changes to be made to the system. For example, the reporters and editors would like more CRTs, and the company is thinking of expanding the system in the future. Additional CRTs will require a larger front-end system, he noted.

Much of the savings achieved by the conversion took place in the composing room, where a former roster of 101 foremen, typographers and technicians has dropped to 57, and in the proofroom, which now employes four full-time and three part-time proofreaders vs. 14 and three previously. Nearly all departures were accomplished through retraining and/or transfer, voluntary retirement or resignation, Daniels said.

Savings in Salaries

The current annual payroll saving from this change is estimated at $628,500; with a further drop to 40 composing room personnel expected by the end of 1977, the 1978 payroll savings will probably amount to $724,500, excluding new contracts or salary increases, he added.

Times reporters write local stories at the CRTs and queue them to the city desk for evaluation and editing. The city editor passes them, on queue, to the slotman who adds page, length and headline instructions to the files.

Copy editors call up the stories on CRTs, edit and write headlines according to the directions and queue the stories to a "backreader," or a final checkpoint. Upon his approval he types a simple command on his CRT that sends each story through justification and hyphenation and on to the phototypesetter.

At the larger *News and Observer*, stories follow a similar route, although more editors are involved and 10% of local copy is still written at typewriters.

The company faced a problem in supplying full electronic capability to both

(Continued on Page 30)

EAI Minihybrid for Simulation Combines Digital, Analog CPUs

WEST LONG BRANCH, N.J. – Electronic Associates, Inc. (EAI) has a small-scale, integrated hybrid computer system called Minihybrid for simulation purposes in educational, biomedical and industrial applications.

The system offers the I/O and stored memory of a digital unit and the high-speed parallel mathematical computation power of an analog processor, the company claimed.

Minihybrid has the ability to solve sets of up to 12 differential equations at the same time, a spokesman added.

The system processors are the EAI 185 parallel analog processor which features analog computational modules and analog and digital trunks and an EAI Datapacer digital processor with up to 32K words of 16-bit core memory, hardware multiply/divide, 64 priority interrupts and power fail protect.

The system features a hybrid communications interface with 60 analog/digital channels and a Teletype ASR-33-compatible teletypewriter for digital I/O.

The Minihybrid can be expanded to include an alphanumeric/graphic CRT, an X-Y plotter and additional digital, analog and interface capabilities, the spokesman noted.

Software for the system includes the Datapace operating system. A handbook provided with the unit details the principles of transforming equations into programs by interconnecting the necessary computing modules, EAI said.

The basic system with 16K digital processor, 133K floppy disk, EAI 185 parallel analog processor, hybrid communications interface and a teletypewriter costs about $35,000, the company said from West Long Branch, N.J. 07764.

16-Port Link-200 From Randal Designed for Business DP Users

TORRANCE, Calif. – The Randal Data Systems Link-200 system accommodates a maximum of 40M bytes of disk storage, 65K characters of memory and 16 ports for multiterminal time-sharing operation, the firm said.

The Link-200 is compatible with the other members of the firm's Link family and is programmed in Business Basic, the firm noted. It runs under the Randal Timesharing Operating System.

Application programs available for the Link-200 include accounting, payroll, word processing, text editing and inventory entry and control. Communications, remote job entry (RJE) and data entry packages are also available.

Also introduced with the Link-200 were industry application packages for the lumber industry and for medical or dental practice management.

A basic Link-200 system with 32K of memory, 10M characters of disk and a CRT costs $20,000 or can be leased for about $450/mo.

The system can accommodate printers with speeds of up to 600 line/min, printing terminals, 800- and 1,600 bit/sec magnetic tape, card readers and IBM, Univac and other vendors' communications/RJE packages, the firm claimed.

Randal is located at 365 Maple Ave., Torrance, Calif. 90503.

Line Printers--Immediate delivery.

Short-term-rental/Lease/Purchase • Minicomputer & System/3 compatible • Nationwide service • Over 500 installations nationwide

Name ______
Title ______
Company ______
Address ______
City ______
State ______ Zip ______
Tel. No ______

Take Your Pick

☐ 100 LPM DEC/Tally
☐ 200 LPM GE/Tally
☐ 300 LPM GE/Data Products/Data Printer
☐ 400 LPM Data Printer/Data Products
☐ 500 LPM Data Printer
☐ 600 LPM Data Printer/Data Products
☐ 700 LPM Data Printer
☐ 900 LPM Data Products
☐ 1,000 LPM Data Printer
☐ 1,200 LPM Data Printer/Data Products

1039 E. Main Street, Stamford, Conn.
East, (203)327-9210, Midwest, (612)890-8988, West Coast, (714)549 8555

Digital Associates Corporation

America's Leading Independent, devoted exclusively to Line Printer Systems

Napacomp Turnkey Reduces, Analyzes Data

VALLEJO, Calif. – A turnkey minicomputer designed to analyze, reduce and display data and the functions of data is available from Napacomp Corp.

The mini, designed for industrial, laboratory and military applications, "looks at gross data," manipulates and takes the functions of data, fits curves to the data or function and analyzes it, the firm said.

Hardware for the system includes an Interdata 8/16 minicomputer with 65K bytes of memory, a moving-head disk, CRT, hard-copy unit and RS-232 interface.

An optional tape unit is "strongly suggested" for the system, a spokesman noted.

The basic system costs $54,000 including the tape unit and specialized software.

Some of the options available include additional disk, card reader and a plotter.

The system features control of all operations via input from the CRT/keyboard, on-line selection and/or algebraic transformation of data, on-line data base management editing capabilities and interactive control and specification of output data, Napacomp said.

The vendor is at 601 Sacramento St., Vallejo, Calif. 94590.

Wang Adds Word-Process Family

TEWKSBURY, Mass. – A family of microprocessor-based word-processing systems, the System 10, 20 and 30 has been introduced by Wang Laboratories, Inc.

The modular systems, configured in various arrangements of a CRT-based workstation, disk and 40 char./sec daisy-wheel printer, contain an Intel 8080 processor in each of the devices, according to a Wang spokesman.

The controlling microprocessor unit is located in the diskette unit and has a 16K memory associated with it, he added. The units are connected by coaxial cable, he noted.

The disk can store from 200,000 char. or 80 pages to 10 million char. or 4,000 pages, the firm said. The systems feature insert/delete/move instructions for characters, words, lines, paragraphs and pages. Operator prompts are displayed on the CRT.

Automatic half-spacing, page numbering, hyphenation, pagination, paragraph indent and centering as well as document merge are among additional features, Wang said.

A System 10 with a workstation, system diskette and 40 char./sec printer costs $12,000; the System 20 with workstation, system diskette, archive diskette and 40 char./sec printer costs $18,400; the system 30 with a workstation, 10M-byte disk, archive diskette and daisy printer costs $30,000 from Wang at 836 North St., Tewksbury, Mass. 01876.

Disks Fit Nova

MOORESTOWN, N.J. – Tri-Star Computer Systems, Inc. has 40M-, 80M- and 300M-byte disk subsystems for Data General Corp. Nova minicomputers.

Included with each subsystem is a controller, drives, power supply interface and cables; up to four drives can be accommodated by each controller, Tri-Star said.

An 80M-byte subsystem costs about $17,000 from the company at 304 Harper Drive, Moorestown, N.J. 08057.

System Saves $628,000 /Year

(Continued from Page 29)

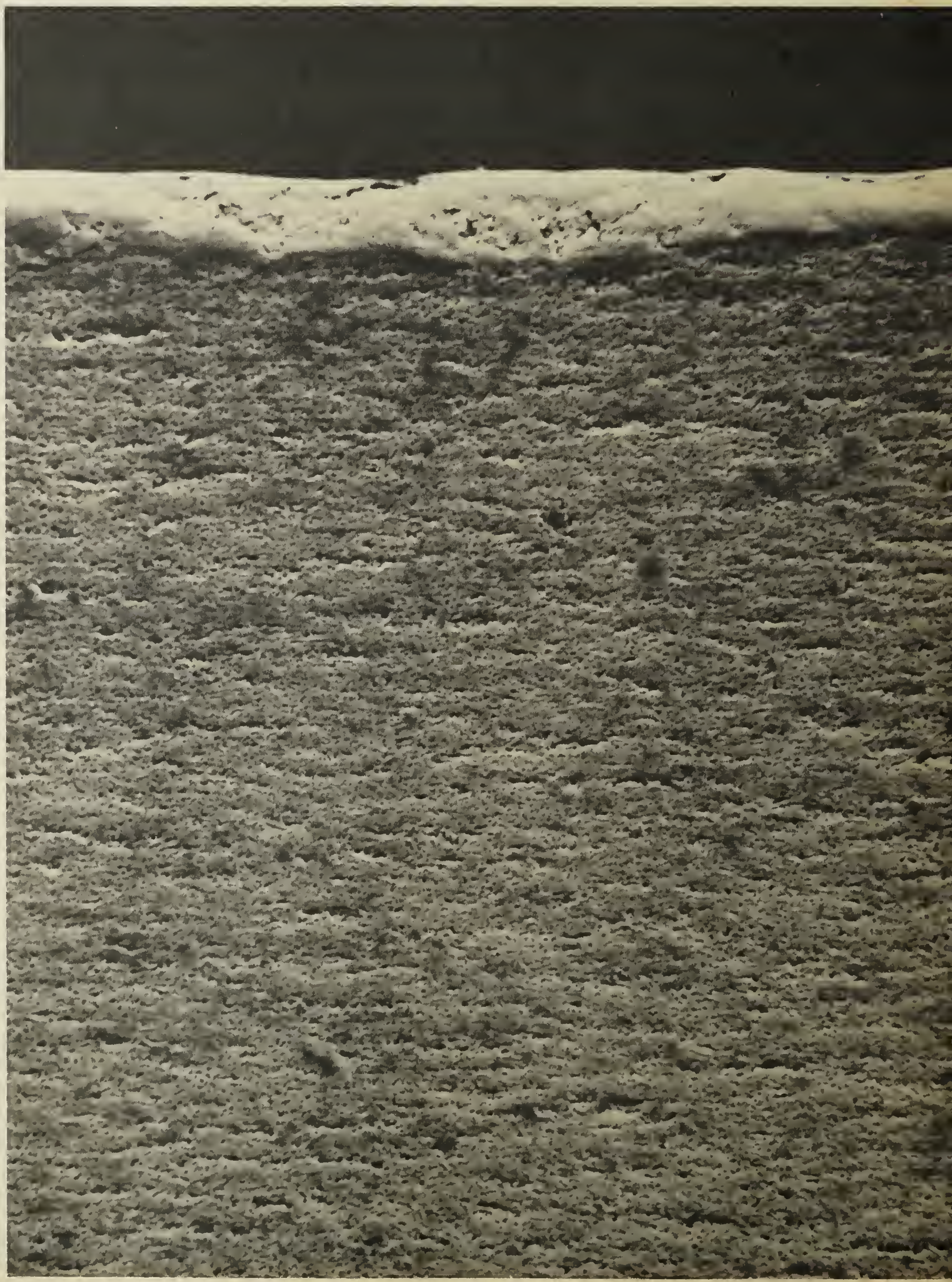
the *News and Observer* and *Times* staffs while keeping newsrooms separate. The system supports a maximum of 32 terminals, and for a while the company faced a choice of combining the newsrooms or buying a second computer.

But, as Daniels noted, Raleigh's two papers, although under common ownership, thrive on a competitive spirit. "Separate news departments make for better newspapers," he said. "Physical separation keeps them honest and creates a sense of pride."

To permit installation of the extra 26 video terminals, production director Ivan Mims designed a switchboard to permit connection of CRTs in one newsroom when those in the other newsroom are not in use. Thus, when editorial deadlines pass for the *Times* and pairs of terminals are shut down, corresponding pairs in the *News and Observer* newsroom are placed on-line.

Editors claim the system's biggest advantage for them is in gaining time for breaking stories and having greater editorial control of the product, and Daniels agreed with them.

"We can handle a late story in a third of the time it took before," *Times* managing editor Michael T. Yopp said. "We have been able to get last-minute stories into print that we would have had to skip otherwise."



Lab's Mini Increases Gathering of Test Data Tenfold

SAN ANTONIO, Texas – A minicomputer at the Southwest Research Institute (SWRI) here is gathering 10 times more data with greater accuracy than is possible manually, the user said.

SWRI's engine laboratory, which tests lubricating oils and other automotive products, uses a minicomputer data acquisition and test-monitoring system to collect and log temperatures, pressures and speeds.

The system prints out summary plots and tabulations in real time. It also alerts operators to the parameters that threaten to violate specification range limits, according to a spokesman.

Engines Operate At Once

The laboratory's data acquisition system (DAS) administers the tests for oil and chemical companies. Any of 50 engines can be operated simultaneously to perform the eight different programmed qualification tests to army specifications, he added.

Should an engine parameter approach specification range limits, an alarm message is printed on the teleprinter and displayed throughout the laboratory via a closed-circuit television system, alerting the operator where manual adjustments must be made.

Alarm test specifications are set closer than the actual test specifications so an alarm message will occur before the value actually goes out of limits, he noted.

The automated laboratory is operated by a Hewlett-Packard (HP) 2100A real-time minicomputer system with 24K memory and various signal conditioning and scanning electronics for taking readings, as well as I/O peripherals.

Another HP 2100A minicomputer system with a 32K memory capacity digital voltmeter and scanner controller spares provides backup data storage and I/O facilities to the engine laboratory system while also servicing general-purpose and software development needs.

Other products evaluated here include hydraulic oils, additives, automatic transmission fluids, fuels, antifreeze compounds, tires and engine components.

The institute is also engaged in a variety of applied research and development covering several scientific disciplines – biomedicine, electronics, mechanics, chemistry, physics and social sciences.

The DAS contains capacity for 800 separate analog channels, allowing 16 sequential channels to each engine.

The DAS includes the HP 7900A disk subsystem with capacity for 2.5M words. Also part of the system are an HP 2748A tape reader, three HP 2640A keyboard display terminals and an HP 2754B teleprinter, the user said.

The channels are assigned to take readings of cooling water-out temperature, water-in temperature, oil temperature, intake air temperature, exhaust temperature, intake and exhaust pressures; oil and jet pressure and humidity.

Disk Formatter Supports 3330s

SUNNYVALE, Calif. – Ball Computer Products has a microprocessor-based disk formatter subsystem with a minicomputer interface for disk drives using IBM 3330-type technology, the firm said.

Features of the Model 3300 disk formatter include the supporting of record formats in variable sizes, internal data encoding and decoding, error correction and a first-in, first-out (Fifo) buffering technique that matches disk speeds to minicomputer timing, the company said.

The 3300 accommodates up to eight spindles in a daisy-chain arrangement, Ball said. The formatter's microprocessor permits seek overlap operation, it noted.

The format technique allows standard minicomputer fixed-sector recording of any size; IBM-compatible variable-length record format can also be implemented, Ball said. The error-correction code is compatible with IBM code, the firm added.

The 3300 costs $5,000. Ball is located at 860 E. Arques Ave., Sunnyvale, Calif. 94086.

Pharmacy Turnkey Based on Reality CPU

JENKINTOWN, Pa. – Health Care Computer Systems, Ltd. has a turnkey minicomputer pharmacy system designed for retail pharmaceutical consultants, hospitals and nursing home druggists, according to the firm.

The system keeps track of drug interaction and patient histories and offers a financial and billing subsystem.

Based on a 16K Microdata Reality minicomputer, the system includes 5M bytes of disk, a CRT, tape drive and 165 char./sec printer.

Users communicate with the system through local or remote terminals, the firm said.

The basic system costs $40,000 and software is licensed for $15,000. The company is located at Foxcroft Sq. Apartments, Jenkintown, Pa. 19046.

Right now, you could be on the edge of destruction.

You're looking at a byte's-eye view of the major cause of early tape retirement: edge damage. It can happen to any tape, but it's most critical on tape used with 9-track heads, where the outer tracks are a scant 9-thousandths of an inch from the edge of the tape.

It happens because of continual high-speed starts and stops. Because of constant mechanical contact. Because of interference with tape path components. And because human operators can do some pretty inhuman things to tape.

You probably can't see the damage happening. But you can sure see the costly results—dynamic skew, erratic output, data loss and job failures.

So we developed a new tape—Cubic—so named because side-load strength increases by the cube of the tape thickness.

Memorex Cubic has a base film 25% thicker than conventional tapes. As a result, it offers TWICE the resistance to edge damage and lateral movement. It also offers improvements in auto loading reliability and time displacement errors.

See your Memorex representative, write us at 1200 Memorex Drive, MS-0064, Santa Clara, CA 95052, or phone 408-987-2520.

Memorex Cubic Tape—it gives you the edge.

MEMOREXCLUSIVE

See us at Computer Caravan.

CI Notes

NCR Extends Adds Contract For Another Three Years

HAUPPAUGE, N.Y. – NCR has extended for another three years its OEM contract for teletypewriter-compatible CRTs from Applied Digital Data Systems, Inc. (Adds).

The value of shipments to NCR between 1977 and 1980 should exceed $40 million, Adds predicted.

The Adds System 70 intelligent terminal is not included in the OEM agreement, but negotiations are being conducted concerning this product, Adds said.

The terminal maker estimated it will have shipped about $18 million in terminals to NCR by year-end 1976.

Wescon Nears Sellout

LOS ANGELES – Wescon/76 is nearing oversubscription despite advance planning to be about one-third larger than last year's sellout show.

There will be 725 exhibit units on the floor when the show opens its 25th "silver celebration" at the Los Angeles Convention Center here Sept. 14.

Bunker Ramo Realigns

WESTLAKE VILLAGE, Conn. – Bunker Ramo's Electronic Systems Division has integrated its marketing function with Program Management and Advanced Programs.

The realignment will provide more effective orientation to customer requirements and markets as well as a more practical environment for marketing equipment, according to Francis J. Cunningham, president.

Oil Industry's Use of DP Growing

PALO ALTO, Calif. – Computer services expenditures by oil companies will amount to $96 million in 1976 and will more than double by 1981, according to a recent analysis by Input.

Total DP expenditures in the oil industry will amount to about $1.8 million in 1976.

ADR Acquires Upjohn Scheme

The Upjohn Co. has agreed to sell to Applied Data Research, Inc. (ADR) the rights to a scheme it developed that allows in-company interactive execution of user programs previously processed on outside time-sharing services. Upjohn said the technology being sold increases the versatility of ADR's Roscoe.

By Bundling Leased Systems

IBM Stinting Maintenance Mart: Vaughan

By Edith Holmes
Of the CW Staff

NEW YORK – If users who lease equipment from IBM could select their maintenance vendor as those who have purchased systems from the corporation have been able to do since 1969, a whole new market area in the computer industry would open up, according to the former president of an independent maintenance company.

Appearing as a recent witness on behalf of the U.S. government in the trial of its antitrust case against IBM, Comma Corp.'s ex-president, James Ray Vaughan, said he would consider IBM's further unbundling, or separate pricing, of maintenance services advantageous to the marketplace.

He added he could not see how unbundled maintenance would have an adverse effect on IBM's leased computer systems and suggested there must be other ways for the corporation to protect its financial investment in leased systems.

If IBM were to unbundle its maintenance services and charge its leasing customers for these services, the corporation would probably have to monitor third-party maintenance companies for their parts quality, to inspect equipment maintained by third parties on a regular basis and to have performance bonds to which third parties would have to adhere, he speculated.

Vaughan, now general manager of engineering services marketing for Control Data Corp. and once an IBM employee, stated he believes IBM continues to bundle maintenance services where leased systems are concerned in order to protect its assets.

In addition, IBM gains valuable feedback on accounts from those charged with maintaining its systems, he said.

'Option of Selectivity'

An independent maintenance organization like Comma, which was acquired by CDC in 1973 and merged with that company last August, can provide users with "an option of selectivity" by permitting some choice in who maintains their systems, Vaughan said.

The selectivity option works in Comma's favor, too, because the company can decide what equipment it wants to service, he noted.

One of the few independent maintenance vendors, Comma does direct its efforts toward the maintenance of IBM computer systems, particularly the 360 models 30 through 65. But the company also handles equipment made by some peripheral companies and marketed by some leasing firms, Vaughan said.

For leasing companies, Comma offers a financial incentive in the form of the ownership credit in exchange for the chance to maintain their machines. For peripheral firms, Comma serves as a single maintenance source with its "call us first" policy, Vaughan said.

If a peripheral company is willing to pay a "triggering fee," Comma will begin business in a new area where the peripheral maker needs service for his equipment and want to develop markets, he added.

(Continued on Page 34)

FTC Charges TRW, AM Violated Clayton Act With Dual Director

By Toni Wiseman
Of the CW Staff

WASHINGTON, D.C. – The Federal Trade Commission (FTC) has charged TRW, Inc. and the Addressograph Multigraph Corp. (AM) with violating the Clayton Act, which prohibits interlocking directorships between competing corporations.

Both firms have denied the allegation and deplored the investigation of a "moot" point.

The FTC alleged the antitrust law was violated when TRW's chairman, Horace A. Shepard, also served on AM's board between Jan. 1, 1973, and Nov. 6, 1975.

During that period the "business of TRW and Addressograph included, but was not limited to, the manufacture, sale and distribution in commerce of point-of-sale, credit authorization equipment and teller-opeated bank transaction equipment," the FTC complaint stated.

"By nature of their business . . . and location of operations with respect thereto, Addressograph and TRW were competitors, concurrent with respondent Horace A. Shepard's membership on the boards of directors of TRW and Addressograph," the FTC stated.

In its suit, the FTC is seeking to bar TRW and AM from having any common directors with each other or any of their competitors and to bar Shepard from serving simultaneously as a director for any competing firms.

"TRW vigorously denies there has been any illegal interlocking directorships between it and AM. Further, the allegation that TRW and AM manufactured and sold competing products while Mr. Shepard served as a director of AM is false," according to a TRW spokesman.

"TRW intends to take all possible action to contest the complaint," he added.

AM 'Thoroughly Dismayed'

A spokesman for AM said that company is "thoroughly dismayed" not only by the issuance of the complaint, but by the "superficial manner in which the investigation was conducted, by the commission staff's disregard for conscientious efforts

(Continued on Page 34)

Sycor Sues IBM for Infringement

CHICAGO – Sycor, Inc. has filed suit against IBM charging infringement of a patent covering source data entry terminals and methods of implementing such equipment.

In the action, filed in the U.S. District Court here, Sycor is seeking judgment against continuation of IBM's alleged infringement and an award of damages.

The complaint does not, however, state a specific amount for damages or refer to the specific patent number, an IBM spokesman said.

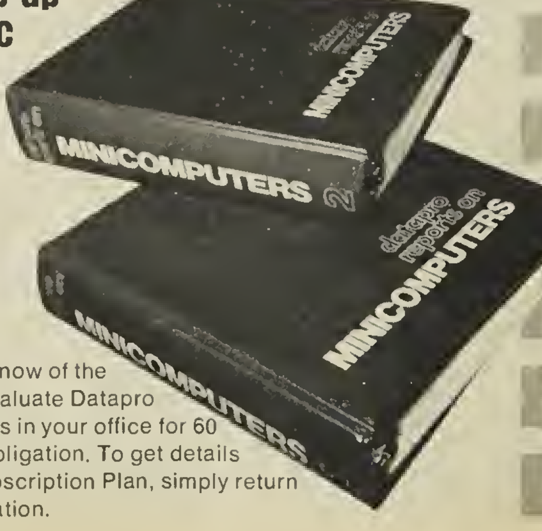
IBM is "confident we have not infringed on Sycor's patent," he added.

The patent in question is No. 3760375 according to Sycor. It is directed to data entry equipment, intelligent terminals in particular, which employ microprocessors to control the operation of a plurality of peripherals.

Sycor is not actually seeking damages but rather a royalty, according to Herbert S. Amster, Sycor vice-president of finance.

Changing Fast!

To help you keep up with the dynamic mini/micro market.



60-Day Trial Review

Act fast! Take advantage now of the opportunity to use and evaluate Datapro Reports on Minicomputers in your office for 60 days, with no purchase obligation. To get details about Datapro's Trial Subscription Plan, simply return the coupon with no obligation.

GETTING SMALLER: Datapro focuses in on the latest developments with tiny microprocessors, microcomputers, minicomputers, and other distributed processing systems that are finding their way into everything from floppy disk controllers and data entry systems to automated gasoline pumps and cash registers. You'll find the most minute (but critical) details you need to put mini/micro technology to work for you—at the smallest cost.

GETTING BIGGER: Every month Datapro delivers an ever-growing collection of specifications, definitions, descriptions, prices, analyses, and user ratings of mini hardware and software—as fast as the mini/micro world expands.

Here's your chance to join the ever-growing thousands of mini-related equipment manufacturers, systems houses, and end users who rely on Datapro Reports on Minicomputers every day. Under our unique trial plan, you'll see that it's the latest, hottest, most complete and accurate information of its kind. In brief, your biggest information value at the smallest cost.

☐ Yes, I would like to learn how I can review Datapro Reports on Minicomputers under Datapro's 60-Day Trial Subscription Plan.

Name__________
Title__________
Company__________
Address__________
City________ State______ Zip_____
Phone__________

For those who value information.
datapro
DATAPRO RESEARCH CORPORATION
1805 Underwood Blvd., Delran, NJ 08075
609-764-0100
CWHHH

IN SYSTEMS AND SOFTWARE, THERE IS ONLY ONE ALTERNATIVE TO ITEL.

And that's no exaggeration, either.

It's something we can back up with fact after fact.

Did you know, for instance, that we already supply systems software for over 300 users of IBM 360's and 370's?

That's because we supply the Kind of software IBM doesn't. The kind of software you need to make your hardware more efficient.

Moreover, the savings are enormous. On specific software features. Or on the entire system, itself.

It's this kind of all out creative effort that has put us right up there with IBM. Not only in systems and software. But in financial packaging. In field engineering. In computer peripherals. In total computer capability.

When it comes to experience and reputation, it's either IBM. Or Itel.

When you get to price/performance, however, there is no alternative.

There is only Itel.

ITEL
CORPORATION
Data Products Group
One Embarcadero Center
San Francisco, California 94111
Telephone (415) 983-0000

IBM Bundling Seen Restricting Maintenance Market

(Continued from Page 32)

Comma generally prices its maintenance services on purchased IBM systems at 20% below IBM prices. In 1970-71, Comma achieved approximately 80% of the maintenance revenue gained by IBM for servicing 360 products, Vaughan said.

Comma has to obtain parts from IBM as well as from the vendors of the peripherals it services. While IBM does not offer a discount on parts, it has permitted Comma to acquire parts, IBM service manuals and engineer assistance with little difficulty, Vaughan said.

IBM "has done an excellent job in answering parts requests" and often "treated comma better than it did its own people," he added.

Many of Comma's customer engineers have come and continue to hail from IBM, lured to the independnet maintenance company for better pay, he said.

Differences With 370s

The former Comma president said the company had tried to follow the same pricing policy with respect to the 370 systems as it has with 360 machines only to find the 370 marketing environment substantially different from that of the 360.

Unlike IBM policies for 360s, features or particular hardware options could only be added to 370s by IBM personnel at the time of installation. Comma could no longer demonstrate its maintenance ability to customers by installing extra IBM features, Vaughan said.

To a certain extent, Comma had been closed out of maintaining 370s because IBM had come to consider these features and their installation company confidential information, Vaughan suggested. IBM had chosen to include in the 370s themselves the basic hardware needed to make engineering changes and considered proprietary the knowledge needed to activate those changes.

In addition, IBM provided users of 370 equipment with remote diagnostic capabilities in the hopes of "retaining" 370 systems. This diagnostic system contained the latest IBM engineering changes, but Comma didn't gain ready access to these changes and to the "symptom fix file" – a file of known historical problems on the machines and the best fixes available to them – until March of this year.

Finally, Vaughan stated, the Fixed Term Plan affected Comma's ability to sell its services to 370 users since purchased 370s carried with them one free year of maintenance, thus giving Comma one year less of product life in which to serve the customer.

Not Cause of Comma's Problems

At the time of CDC's acquisition of Comma in 1973, the maintenance the company was offering suffered from severe problems, but questioning by lawyers for IBM indicated the industry leader was not directly the cause.

Vaughan testified Comma had tried to train its own people on 370s rather than obtain engineers from IBM, but a management reorganization stalled marketing efforts to develop 370 maintenance business and so delayed the adequate use of these people.

Comma also had trouble automating its accounts and accounting system. For a time it could not rely on its accounting data; it had problems with its invoicing system that resulted in outstanding costs tht had to be borne in 1974.

The company could not estimate its revenue from month to month within a 10% tolerance, and inaccurate invoices make it difficult to collect on bills, Vaughan said.

Since its merger with CDC a year ago, Comma has continued its efforts to enter the 370 maintenance market, Vaughan said.

TRW, AM Charged On Clayton Act

(Continued from Page 32)

by AM and others to place pertinent information before it and by the commission's decision to devote its time and federal funds now on a matter that has been entirely moot for several months."

Shepard, he noted, has not served on the board of AM since 1975.

AM firmly believes there was no competition between the two firms during Shepard's directorship, he added.

"However, even if Amcat credit authorization terminals were in competition with certain TRW products as alleged by the FTC, it would have been so inconsequential as to be meaningless under the law . . . since revenues produced by the sale of Amcat terminals in that fiscal year amounted to only 26/100 of 1% of AM's total revenues," the spokesman said.

AM further contended the FTC's regional office in Cleveland ignored an offer by AM to provide pertinent and detailed explanatory information and proceeded to request that the complaint be issued.

Hearings will be held Aug. 24.

BRIGHT,
REFRESHING,
BAUDY,
AND NEW
IN TOWN.

Whot o beouty!
The new OMRON 8030 CRT Terminal is the one you've been dreoming obout. It has on 8080 IQ – smart enough for the most demonding opplicotions, 9600 Boud, ond multiple poge refresh memory. And woit 'til you see the other features!
It's o very clossy pockoge for o very reosonoble figure. Get properly introduced by OMRON.
Coll or write for oll the specificotions to:
OMRON Corporotion of Americo
Informotion Products Division
432 Toyomo Drive, Sunnyvale,
Californio 94086 (408) 734-8400

OMRON
Love at
first sight

For OEM & Distributor pricing information contact OMRON, Sunnyvale, CA. Offices OMRON CORPORATION OF AMERICA – Oxon Hill, Md. (301) 248-2150; Englewood Cliffs, N.J., (201) 871-3460. OMRON Europe GmbH Hamburger Strasse 11, 2 Hamburg 76, West Germany, TWX 841/213-403+. OMRON Tateisi Electronics Co., Tokyo, TWX 246-6813 and Kyoto, TWX 542-2889.

Detach here, moisten and seal envelope securely before mailing.

Fold and insert order form (attached through binding) and remittance here.

Use the attached order form and this envelope for:

- **A new subscription**
- **New address**
- **New Title**
- **New Industry**

Order form is attached through binding. Be sure to include current label or label information when making a change.

First Class
Permit No. 40760
Newton
Mass.

BUSINESS REPLY MAIL

No postage stamp necessary if mailed in the United States

Postage Will Be Paid By

COMPUTERWORLD
797 Washington Street
Newton, Mass. 02160

CIRCULATION DEPARTMENT

Says Industry Not Too Fragmented

Cadapso Sees No Need for Government Intervention

By Toni Wiseman

Of the CW Staff

TORONTO – The Canadian services industry is well equipped to meet that country's future needs and there is no justification for government intervention, the Canadian Association of Data Processing Service Organizations (Cadapso) said in a brief submitted to the Department of Industry, Trade and Commerce (ITC).

The privately owned computer services companies "have demonstrated an ability to grow with the needs of users and have significantly exceeded average rates of industrial growth," Cadapso stated.

The brief made five major recommendations aimed, according to Cadapso, at improving government understanding of the services industry's concerns.

The brief asked ITC to recognize the "unique" position of the industry, to support taxation policies "which will contribute to the viability" of the industry and to lend its support to Cadapso's position on such legislative matters as the revision of the Bank Act.

The Canadian computer services industry is not excessively fragmented and it is natural that the companies are concentrated in central Canada, where there is the greatest demand for DP servcies, Cadapso told ITC. And, the brief noted, telecommunications makes physical location questions irrelevant.

About 25 companies account for 75% of the total industry revenues, thereby achieving a relatively more substantial dominance within their industry than their U.S. counterparts, Cadapso said.

"There is a basic contradiction in the expressed desire to see a reversal of so-called fragmentation and, at the same time, an increase in the number of companies operating central computing facilities in the regions outside central Canada," the brief added.

"The natural play of the free market will bring about the desired rationalization of the industry while at the same time meeting those service market opportunities existing in eastern and western Canada.

International News

"Any attempt to interfere with natural economic conditions will inevitably produce distortions and therefore should not be undertaken," Cadapso warned.

The top 25 Canadian service companies have grown at a rate of 35% compounded annually from 1970 to 1974 and have shown the ability to "grow with the needs of the users."

The brief also noted deterrents to the growth of the services industry in Canada, such as the 30% capital cost allowance. The allowance is "a step in the right direction," but makes it difficult for Canadian companies to compete with U.S. firms because the U.S. cost allowance rate is 40%.

Unfair competition from banks, Bell Canada and "casual" service participants such as universities and private industries pose a threat to the industry's viability, the brief noted.

Software in Canada Gets Full Depreciation

OTTAWA – The Canadian government has issued a new federal budget which provides for a 100% capital cost allowance on software.

It also provides an increase from 20% to 30% in the depreciation allowance for computer hardware.

It was previously believed all software development could be expensed for tax purposes and software was therefore not regarded as a capital item.

In January, however, the Department of National Revenue issued an interpretation of the existing law which suggested software was a capital item and had to be depreciated on a company's books at a rate of 20% declining balance.

This would have had a depressing effect on software sales because it would have resulted in increased tax payout at the time of acquisition or development of major software, according to the Canadian Association of Data Processing Service Organizations (Cadapso).

As a result of Cadapso's efforts, the government came out with the revision which stated that, while software was indeed a capital item, it could be depreciated fully in the year of development.

1976–78 Pakistani Market Seen Limited for U.S. Gear

WASHINGTON, D.C. – Pakistan offers a limited market for office machinery and equipment, with total imports between 1976 and 1978 estimated at $10 million, according to a report from the U.S. Department of State.

The U.S. market share has remained relatively low and is not expected to rise above 10% in the next three years, mainly because of relatively higher prices and the import of machinery and equipment through European and British subsidiaries of the U.S. companies, State said.

Typewriters comprise the largest single component of total imports of office machinery and equipment. In 1974, typewriter exports to Pakistan were valued at $1.3 million, while computer exports for the same year were only $463,324.

Recent technological developments in areas of capital intensive production of microcircuitry have regained a competitive price and quality advantage for U.S. minicomputers, the report stated.

The State Department further noted that while the projected market for microcircuitry products in Pakistan is not large, Pakistanis tend to develop very strong brand loyalty and therefore the long-term market justifies an effort on the part of U.S. manufacturers.

Burroughs users! Now you can eliminate your Achilles heel.

Would a large international bank and thousands of other commercial operations throughout the world use Burroughs computers unless they were very good? Obviously not.

But would the same large international bank, a large bank service company and many other commercial operations substitute IBM-1403's for their Burroughs printers, unless they felt they could improve their printing reliability?

Are quality and reliability of printing your Achilles heel?

If so, we have a simple solution. Adapt an IBM-1403 model -2, -3 or -N1 to your Burroughs system with our Grumman printer controller. The proven quality, speed and reliability of the IBM-1403's should dramatically improve the performance of your printing operations.

Your cost will be nominal. One Burroughs user says he can pay for our printer controller with the savings on ribbons alone. In any case, if you've been paying for extra printing capacity to solve reliability problems, you'll be more than happy with the IBM-1403.

Of course, printing quality and total output are not just Burroughs problems. We are delivering our printer controller to users of CDC, DEC, Univac, Xerox and other computers to solve similar problems. Commercial, educational, scientific, military and computer service bureaus are among our printer controller users.

For multi-vendor installations we can add a switch to your controller to allow you to connect the IBM-1403 to either of two different computers.

You can rent, lease or buy both the printer and controller. For full information, call or write Joe McDonough, Grumman Data Systems Corporation, 45 Crossways Park Drive, Woodbury, New York 11797. (516) 575-3034. Telex: 961 430.

GRUMMAN

GDS 3/76
Printed In USA

Grumman Data Systems

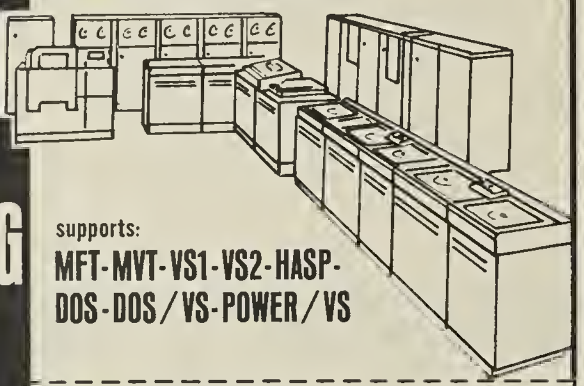
Products and services that lower the cost of computing.

In Canada: Digital Interfaces Ltd., 4800 Dundas St. West, Islington, Ontario M9A 1B1
In Germany: Institut Für Angewandte Elektronik, Zentrale Verwaltung, D 2072 Bargteheide, Am Bargfeld 17, Germany

OVER 700 DP Managers now use the JOHNSON JOB ACCOUNTING REPORT SYSTEM

Send for FREE 30 Page System Characteristics Manual

■ Accurate Job Accounting ■ Continuous Performance Measurement ■ Equitable Cost Distribution ■ Optimized Software Performance ■ Accurate Customer Billing ■ Realistic Thruput Analysis ■ Optimum Resource Utilization



supports:
MFT-MVT-VS1-VS2-HASP-DOS-DOS/VS-POWER/VS

JOHNSON SYSTEMS INC.
8400 Westpark Drive, McLean, Virginia 22101

NAME ______
TITLE ______
COMPANY ______
ADDRESS ______
CITY ______ STATE ______
ZIP ______ PHONE ______
COMPUTER ______ OPERATING SYSTEM ______

CA Says Syfa Does Not Herald Abandonment of OEM Business

By Esther Surden
Of the CW Staff

IRVINE, Calif. – Although Computer Automation, Inc. (CA) is entering the commercial distributed processing arena with the introduction of the Syfa system, the firm will continue to make and market its OBM "naked" products, according to Philip Kaufman, director of corporate product planning.

"We are not abandoning" the OEM line nor "are we turning the direction of the company," Kaufman said in a recent interview here.

The Syfa system is the first product to come out of the firm's Commercial Systems Division. The division also makes the Syfa Information Station CRT, which will only be sold with the Syfa systems.

Natural Progression

The commercial system is a natural progression for the firm, according to D.H. Methvin, CA's president. "We built our corporate base on doing one thing and doing it very well in supplying computer equipment in volume to sophisticated customers," he said.

"We consider our Commercial Systems Division a logical adjunct to what we have been doing, and we are now ready to attack its market after eight years of building our strengths in products, management, service, finances and marketing in other marketing areas.

"We feel that these two divisions [Commercial Systems and OEM] will enable us to grow at a greater rate in the industry than if we had limited ourselves to just one segment," Methvin said.

The trend toward distributed processing in the industry is clear, Kaufman continued. His definition of distributed processing includes multiple computers communicating with each other with a disbursed data base.

"You cannot take all of your problems and put them in a large sack," he said.

A problem with distributed processing is convincing the person who has run a traditional DP shop and his users, who are comfortable passing a stack of cards through a window, that distributed processing is the way to go, he noted.

The Syfa system will be marketed and sold through a totally different sales force, Kaufman added, to selected potential customers.

Takes Systems Approach

As for the other segment of CA's business, the firm will continue to "take the systems approach," Kaufman said.

"In the OEM business, the key to getting the market is to be able to interface" to any company's I/O devices, Kaufman said.

CA has attacked the I/O problem in the last year, producing interfaces that are small processors and easily implemented, he added.

The trend toward microcomputers was noted by Kaufman, who said "we don't really compete with microprocessors." The boundary between minis and micros is "mushy," he said, but "not as mushy as some people think. When you add a chassis, power supply and make the system easy to interface, then the line becomes more blurred.

"A lot of people who have used micros and got burnt" are headed back to minicomputers because they offer systems, Kaufman said.

Want a deal on the terminal you need? Call (800) 227-1102*

*In California call (415) 632-2856

Call NTC — National Terminal Corporation — at our toll-free number, (800) 227-1102. We'll give you instant quotes on the terminals you want. For sale (generally with delivery from stock). For lease or rent.

The lowest prices — on the highest quality, most efficient terminals going. Texas Instruments 745 portable terminal, for instance. (Plus TI 735, 725, 743 KSR, 733 KSR and ASR as well.) DECwriter II printer. Interdata Carousel printer. ADDS 580 and 980 CRT's. And others.

Call NTC right now, (800) 227-1102.

How About A Super Deal on a Used Terminal. These terminals have come off lease. They're in excellent shape, were regularly serviced, and have a 30-day parts/labor warranty.

	Purchase	Monthly Rental
Datapoint 2200-126 (16K)	$6,500.00	$349.50
Datapoint 2200-400 Com Box	650.00	34.95
TI 725 Terminal	1,695.00	89.95
Beehive Super Bee CRT	1,500.00	84.95
Techtran 4100 Datacassette	950.00	54.95

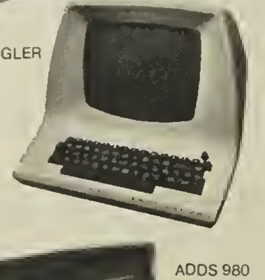
NTC National Terminal Corporation

Oakland Airport Office Center
303 Hegenberger Road, Suite 203
Oakland, CA 94621, (415) 632-2856

INTERDATA 300
$2,725

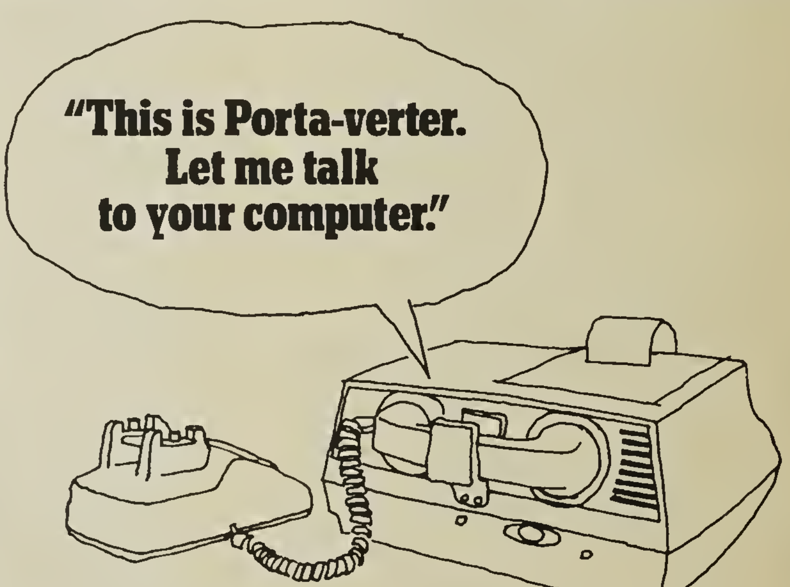
DECWRITER II
$1,625

TI 743 KSR
$1,295
TI 733 KSR
$1,490
TI 745
$1,875



LEAR SIEGLER
ADM-3
$975

ADDS 980
$2,800


"This is Porta-verter. Let me talk to your computer."

Porta-verter is the portable data gathering device that collects information wherever your business generates it. Then gets it to your computer over conventional telephone lines.

Packed with its own power source, its own tape drive and hard copy printer, Porta-verter is ready to record and total every fact and figure when it happens. Where it happens. And you don't have to spend hours or days learning complicated operating instructions. Porta-verter is as easy to handle as a calculator. Everything you enter is immediately visible on a printed paper tape. And is simultaneously recorded on a Cartritape® magnetic tape cartridge.

When you're ready, just hook Porta-verter up to an ordinary telephone. The built-in modem and acoustic coupler will transmit everything to your computer at 1200 baud.

Porta-verter. It's the shortest distance between your business and your computer.

DIGITRONICS
Comtec Information Systems, Inc.
53 John Street, Cumberland, R.I. 02864
Phone 401-724-8500 – TWX 710-387-117

Hi-Line Settles Suit Against Singer, IMA

DALLAS – The Singer System Ten is out and an NCR Century 101 is being installed at Hi-Line Electric Co. following settlement of Hi-Line's suit against Singer [CW, April 2, 1975] and an interim period with an NCR 8200.

Although Hi-Line's President J.P. Schaeffer indicated he wasn't happy with the settlement, he said the agreement was made under duress from his wife.

He had previously suffered a nervous breakdown and was scheduled to go out of the country over the Christmas holidays, so settled before he left, he explained.

"However, if I had it to do all over again, I would have taken them right on" through trial, and "if I'd had a fair trial I would have won, without a doubt," he said.

The firm installed an NCR 8200, but its growth rate was faster than anticipated becuase it started a new division. NCR then suggested a 101, he said.

Further, NCR is giving Hi-Line full credit on the 8200.

"NCR has been most fair and most decent with us. I have no complaints with it whatsoever. It has tried real hard," he said.

Hi-Line had filed suit against Singer Information Management Associates, Inc. (IMA), charging them with fraudulently representing the capacity and capability of the System Ten, for which IMA was to supply the programming.

The firm never received the CRT or accompanying software for this aspect of the system and returned the system in August 1973, a year after it had signed the lease agreement.

Orders & Installations

Exxon Co. has ordered for lease a Trace data capture system and two high-speed sorters from Recognition Equipment, Inc. for installation in its credit-card processing center.

American Management Systems has ordered an IBM 370/155 to double the capacity of its computer center.

Mellon Bank of Pittsburgh has ordered an Incoterm Series 7000 on-line banking system for installation at its headquarters and in over 100 branches in western Pennsylvania. The equipment is valued at over $5 million.

The U.S. Air Force Avionics Laboratory has installed four high-speed digital computers from Westinghouse Electric Corp. for an avionics "hot bench" facility which is part of the U.S. Air Force Digital Avionics Information System program.

Strong's News Agency, a magazine distributor in Arizona, has ordered a 90/30 system from Univac for distribution, general accounting, billing, payroll and other business applications.

Hinky Dinky Stores of Omaha, Neb., has ordered Datachecker electronic point-of-sale systems for three stores from National Semiconductor Corp.

Retailers Electronic Account Processing, Inc. has ordered 100 Source 7600 programmable accounting terminals from MSI Data Corp. for use by independent retail soft goods stores for computerized accounting and billing of their own charge-card customers.

The Asbury Park Press of Asbury Park, N.J., has ordered a T-410 publishing system from Tal-Star Computer System, Inc. for on-line processing of classified advertising, wire service and news copy.

Continental Oil Co. has ordered a Control Data Corp. Cyber 172 system, valued at nearly $3 million, to aid in its search for producible reserves of oil of natural gas.

European-American Banking Corp. of New York, has ordered a Trace check-processing system for lease from Recognition Equipment, Inc.

Cherry Creek School District Number 5 in Englewood, Colo., has installed a Burroughs B1726 system for administrative functions and hands-on training of students.

Rockingham National Bank of Harrisonburg, Va., has purchased a U-COM computer output microfilm system from U.S. Datacorp.

The *Peoria Journal Star* has ordered a Series 2500 copy-processing system from Harris Corp.'s Composition Systems Division. The system will include 16 Harris 1500 editorial terminals, four 2200 display advertising layout terminals and two 7400 Fototronic phototypesetters.

The U.S. Army has installed an IBM 360/50 at Presidio, Calif., under a contract with Dearborn Computer Leasing Co.

The Nevada Industrial Commission has installed Adabas from Software AG on the State of Nevada Central Computer Facility to develop the Workmen's Compensation Policy and Claims System.

POSITION ANNOUNCEMENTS

SYSTEMS ANALYST

We are seeking applicants for a Systems Analyst on our EDP staff to be responsible for the design of all manufacturing systems and future information requirements. This is a challenging opportunity for an innovative problem solver.

Qualified applicants should have a college degree with a minimum of three years' system design experience and a strong background in manufacturing systems and data communications. COBOL experience helpful.

We offer an excellent starting salary and benefits package with considerable growth potential.

Interested individuals are invited to send their resumes, in strict confidence, to Mr. W.E. Pratt, Manager-EDP & Systems, ITT Grinnell Valve Division, 1021 E. Water St., Elmira, N.Y. 14901. *An Equal Opportunity Employer M/F.*

HARDWARE/SOFTWARE MONITOR

To $25,000

Our client, a major New England employer is expanding it's computer facilities and has an immediate need for an experienced Monitor of large-scale IBM equipment. The position also presents the possibility of occasional international travel. This is a new position offering virtually unlimited growth and a high degree of corporate visibility.

Write or call: Joseph Austin, Data Processing Account Mgr.

Dunhill
of Worcester, Inc.
1515 Mechanics Tower
Worcester, MA 01608
(617) 798-0116

All inquiries held strictly confidential.

MOVING?

Please notify *Computerworld* at least four weeks in advance. When writing about your subscription, please enclose a recent mailing label. The code line on top may not mean much to you, but it is the only way we have of quickly identifying your records. If you are receiving duplicate copies, please send both labels.

797 Washington Street
Newton, Massachusetts 02160

Computer Programmer

Our Cincinnati-based firm is a nationally recognized leader in its management consulting field. We have recently developed a requirement for a computer programmer with a desire to use skills in large scale applications. Our requirements are:

- Degree in Science, Mathematics, Engineering or other technical area.
- Computer programming experience with large systems.
- Thorough knowledge of Fortran. COBOL or Assembler knowledge is a plus factor.
- 1-2 years work experience.

Please send resume with salary requirements to:

CW Box 4731
797 Washington St.
Newton, Mass. 02160

An Equal Opportunity Employer

EDP OPPORTUNITIES

$20-$40,000

BANKING Systems-computerized financial communications sys exp $30-40M
LIFE Ins systems-proj ldr. C.F.O., Alice, Life 70, Cobol BAL $25M
FORTUNE Co seeks IMS designer $25M
EDP Auditor 50% trvl-Fort conglom $22M
MGMT Sci/OR-Fort co PDP Masters deg nec $24M
INVESTMENT Resch Anal-Mark IV, IMS $20M

Bill Borrelli (212) 349-3610

William Harris
Associates
150 B'way, N.Y.C. 10038

MIDWEST DP OPPORTUNITIES

Sr. Info System Planner	24-28K
Mgr of Group Systems	22-26K
Corp Mfg System Consultant	22-25K
System Project Mgr	22-24K
Systems Analyst	18-23K
Level Programmer	19-23K

Call (614) 457-0304

Wells/Kersey Assoc., Inc.
P.O. Box 20226
Columbus, OH 43220

Banking Specialists

Career opportunities available in an Atlanta Commercial Bank's expanding Systems and Programming Department. Self-motivated professionals needed in the exciting world of on-line transaction processing systems and banking applications in a multi-processing and multi-programming environment.

Programmers: Minimum two years experience in COBOL, preferably on a large to medium scale system with banking application experience.

Analysts: Two years experience in systems design with a COBOL programming background. Banking applications experience necessary.

Programmer: Six months to one year experience on a mini-computer preferably a Varian. This position ideal for a programmer desiring to move into a COBOL assignment.

We offer an excellent benefit package and a salary commensurate with experience. Send resume with current salary to P.O. Box 23, Atlanta, GA 30301. *An equal opportunity employer M/F.*

PITTSBURGH EDP CAREERS

We are EDP recruiting specialists concentrating on positions in the Pittsburgh and Tri-State area. The following is just a cross-section of the opportunities that are available.

Systems Programmers (5) To $26K
IBM hdwe, sftwe, OS internals
T/P Specialist To $17K
IBM 370/OS, Cobol
Prog/Analysts (7) To $19K
Cobol, Mfg, Bus & Banking
Programmers To $18K
Cobol, IBM & Honeywell.

Send resume including salary history in confidence to Barry Lopez, c/o:

CAMERON OF PGH., INC.
428 Forbes Ave., Suite 412
Pittsburgh, Pa. 15219
(412) 391-7409

PROGRAMMER

College degree and 2 or so years COBOL or H58 or other mini-computer. Must be promotable for progressive co.

$12-$14,000

ROBERT HALF
PERSONNEL AGENCIES
333 North Michigan Ave.
Chicago, Ill. 60601
(312) 782-6930

SENIOR SYSTEMS ANALYST

Georgetown University is seeking an indiv. w/3+ yrs. pgm'g & sys anal. exp. Min. qual. incl: prof. in ANS COBOL, B.S. (prefer Bus. Adm. or Comp Sci.) exp. w/ admin/financ. applic., good oral/written skills. Prefer candidates w/ add. exp. in: project mgmt., student records. IBM OS or VS, IBM OS/JCL, IBM VSAM files, on-line systems, CPM/PERT/GANTT, structured pgm'g. Our environ. includes an IBM 370/145, PDP 11/45 & PDP 11/10 batch & on-line sys. Sal. to upper teens, excell. benefits, Please forward resumes (incl. sal. hist.) to: Ms. C. Dade, Georgetown Univ., Personnel Off., 3700 Reservoir Rd. N.W., Wash., D.C. 20007. We are an equal opportunity/affirmative action employer.

DIRECTOR
Administrative Systems and Programming

Arizona State University has a director, administrative systems and programming position open, effective immediately. The director is responsible for a staff of 30 and 40 applications analyst/programmers, developing and maintaining major application systems. Data base management system are being reviewed for all new applications. The university computer center operates a Univac 1100/42 for administrative and academic processing. Bachelors degree required, M.S. preferred, university administrative data processing experience necessary. Application periods ends August 19, 1976. Send all inquiries to Arizona State University, Personnel Department, Academic Services Building, Tempe, AZ 85281.

Equal Opportunity Employer

SALES MANAGER

Leading company in manufacturing of electromechanical components used in computer peripheral equipment, is seeking person to be responsible for the marketing program of a major new product line. The individual should be well versed in the technical details associated with disk files. Responsibilities will include marketing plans, sales promotion, and direct customer contact at the engineering and purchasing levels. ME or EE degree or equivalent desirable. Salary commensurate with experience. Attractive fringe benefits. Reply with resume and salary history to:

S.L.I. INDUSTRIES
21040 Victory Blvd.
Woodland Hills, CA 91364
Equal Opportunity Employer M/F

Systems Analyst

Perform program development and maintenance on Cyber 73 operating systems software.

Excellent career potential with B&W, a high technology leader in the nuclear energy industry. Our large controlled data processing installation runs Cyber 73/7600 Link. We seek candidate with three to five years experience as Systems Analyst or Programmer, understanding of scope operating systems, familiarity with systems maintenance and BS-Computer Science, Math or related.

We offer a professional environment, attractive location, excellent salary and benefit plans. Please write in confidence indicating salary history to Mr. George Bunch, The Babcock & Wilcox Company, P.O. Box 1260, Lynchburg, VA. 24505. An Equal Opportunity Employer M/F.

Babcock & Wilcox
Nuclear Power Generation Division

SYSTEMS SOFTWARE CONSULTANT

Sysgens, DOS, VS, 370/145
BAL COBOL
RPG II A Challenge!
$22,000-$24,000 FEE PD

ROBERT HALF
PERSONNEL AGENCIES
522 Fifth Avenue
New York, NY 10036
(212) 221-6500

Manager, Systems And Programming

New position provides excellent opportunity for experienced manager.

Responsibility will include standards, feasibility studies, systems design, and programming.

Installation is 370/135, DDS/VS, TOTAL, ENVIRON/1 and PANVALET. Staff consists of 9 Analyst/Programmers.

Salary commensurate with experience.

Send resumes to: Personnel Office, St. Louis Community College, 5801 Wilson Ave., St. Louis, Mo. 63110

PARTNERSHIP

opportunities exist with Romac

Romac is expanding and seeking partners for offices to be located in NYC area, Pennsylvania, Ohio, and in southeastern cities. The opportunity to be an independent businessman exists for the well-motivated and experienced individual. A record of accomplishment in the field of accounting or finance or in a sales-oriented data processing environment could provide the business experience necessary for success.

Please contact:
H.B. Dunn, President
125 High Street
Boston, MA,02110
(617) 482-7748

ROMAC
& ASSOCIATES/Personnel Consultants

A network of Partners in: Portland, Hartford, New Haven, Stamford, Rhode Island, Buffalo, Rochester/Syracuse, Wellesley Hills, Ma., Boston, Washington, D.C., Charlotte & Atlanta.

DATA PROCESSING PROFESSIONALS
PROGRAMMERS AND ANALYSTS

Major NY insurer has several key openings for experienced data processing professionals with a flair for creativity and ingenuity in its expanding data processing operation. Career opportunities available at various levels using IBM's largest hardware and latest software, OS/VS System 370/168, MVS, TSO, IMS, On-Line data based systems, COBOL and ALC.

In exchange for your knowledge and experience, we'll offer you challenging assignments, top salaries, and excellent opportunities for advancement. Insurance system background a plus, but not required.

Send resume and salary requirements in confidence to: Ms Barbara Macdonald

THE HOME INSURANCE CO.
59 Maiden Lane, New York, N.Y. 10038
An Equal Opportunity Employer m/f

DIRECTOR TECHNICAL SALES

Continue your career on the forefront of Computing and Computer Networking as part of the overall role of the IUPUI Computing Services Division.

Responsibilities include analysis, design and implementation of applications projects, consultive and client services, and systems software development.

Major equipment at Indianapolis includes a DEC-10 (KL) and an IBM 360/44; major equipment also accessed includes a CDC 6600 and an IBM 370/158 in Bloomington. (The DEC, CDC, IBM systems are part of the eight-campus Indiana University Computing Network.)

The section's professional, technical and clerical staff numbers approximately twenty-five and supports diverse activities from the academic community of this 20,000-student campus and medical center.

Qualifications: Graduate degree preferred (Medical/Math/Science) plus a successful supervisory and managerial experience in computing of at least five years.

Send Resume and Salary History to:

INDIANA
UNIVERSITY
PURDUE
UNIVERSITY
at INDIANAPOLIS
Personnel Office
1100 West Michigan St.
Indianapolis, Ind. 46202

An Equal Opportunity Employer M-F

Jacuzzi

Corporate growth, recent hardware upgrade and data communications plans necessitate data processing staff expansion for this major manufacturer. Excellent opportunity for able, energetic individuals who seek a professional career in data processing. We offer outstanding fringe benefits and opportunity to advance on demonstrated performance. Salary commensurate with qualifications and experience.

PROGRAMMING MANAGER

Responsible for all program development for manufacturing information systems. Supervise a programming staff of four and maintain all systems software. Maintain and develop data communications software for on-line systems.

Candidates must have at least a Bachelor's degree and five years programming experience. COBOL background and teleprocessing experience on Burroughs hardware highly desirable.

SYSTEMS ANALYST

Responsible for analysis, design and implementation of manufacturing information systems. Participate in corporate long-range planning and policy and procedure development.

Candidates must have at least a Bachelor's degree and three to five years working experience in systems design. Teleprocessing design experience on Burroughs hardware also highly desirable.

Send resume, including employment history, salary requirements and interview availability to:

PERSONNEL MANAGER

Jacuzzi Bros. Inc.

11511 New Benton Highway
Little Rock, Arkansas 72203
An Equal Opportunity Employer M/F

COMPUTER TELEPROCESSING PROGRAMMER

Software consulting firm needs a teleprocessing programmer analyst with 2-4 years IBM BAL coding experience. Teleprocessing and light systems programming experience with DOS or DOS/VS a plus.

Please send resume including salary history to CIS Corporate Facilities Group, Inc., P.O. Box 2543, Charleston, WV 25302.

DATA BASE SPECIALISTS INQUIRE, IMS

Rapidly expanding proprietary software sales & service firm in No. Virginia offers creative growth opportunities for intermediate & Sr. level Data Base Software specialists. These are immediate pre & post sales support positions leading to marketing/management. Starting salaries to $25K plus. Call or submit resume to:

Dunhill
OF SPRINGFIELD, INC.
7015 Keene Mill Road
Springfield, Virginia 22150
(703) 569-3410

SYSTEMS CONSULTANTS

New England consulting/research client has immed need for expd indiv's in MVS, JES3 + ASP Internals. A unique opty to combine implementation and instructional capabilities to a challenging career. Salary to $30K (fee pd). Contact Stan Durbas.

ROBERT HALF
PERSONNEL AGENCIES
111 Pearl Street
Hartford, Conn. 06103
(203) 278-7170

Data Processing (Administrative) — Manager: professional position responsible for computing facility; for supervision of staff of twelve; for planning, budgeting, scheduling, programming. Burroughs B-3500. Applicant must have B.A. in computer science, mathematics, or equivalent major; 3 to 5 years experience in programming, including COBOL; administrative and managerial experience. Experience in Systems Analysis desirable, knowledge of IEP helpful. Salary range: $14,800 - $18,850. Final offer and salary contingent on State Budget approval. Send letter of application, resume, five references to Vice President for Administrative Services, State University of New York College at Brockport, Brockport, New York 14420. An equal opportunity, affirmative action employer.

PROGRAMMER/ PROGRAMMER ANALYST

Rapidly growing national life insurance company has opportunities for experienced Data Processing personnel.

SYSTEMS/PROGRAMMING ANALYST

3-5 years systems & programming experience of which 1-3 years should be in life & health insurance. Strong COBOL and OS background necessary.

PROGRAMMER/ANALYST

1-3 years systems & programming experience using COBOL under OS. Life insurance experience preferred, but not necessary.

These positions offer an attractive salary and a comprehensive benefit package. Convenient downtown St. Paul location. For further information, please call 221-7005.

Western Life
Insurance Company
385 Washington Street
St. Paul, Minnesota 55102

The St. Paul

An Equal Opportunity Employer

Manager of Systems & Programming

We are seeking a results oriented problem solver to join our team as Manager of Systems and Programming.

Applicant should be degreed; have a minimum of 6 years experience, and heavy Systems background, knowledge of COBOL and good management skills.

Send resume and salary history to: K.M. Nicholson, Director of Human Resources, **STAR MARKET CO.**, 625 Mt. Auburn St., Cambridge, MA 02138.

Equal Opportunity Employer

Computer IMS Project Manager

University of Missouri is rapidly expanding into DB/DC technology for administrative applications and is searching for a Project Manager to help lead this effort. Application areas include accounting, budget, personnel/payroll, student records, and others. Requires extensive experience with IMS DB/DC, B.S. degree or equivalent in Business, mathematics, or related fields, three to five years as systems analyst/project leader in a commercial environment. Higher education experience a plus. Send resume to:

Univ. of Missouri-Columbia
Personnel Services
309 Hitt St.
Columbia, MO 65201
An Affirmative Action
Equal Opportunity Employer

SYSTEMS ANALYSIS & SALES

For

Plycom tm services

We have recently filled two positions but still have one excellent growth opening for a people oriented computer professional in the area of applications software development and sales. We are a DEC DATA SYSTEM OEM with extensive business applications experience using the PDP-11 RSTS/E operating system and BASIC-PLUS. Successful applicants will have ability to both support and sell our applications systems.

Substantial commercial applications experience preferred.

Send complete resume and salary history including references to Mr. Al Chesser, PLYCOM Services, P.O. Box 160, Plymouth, IN 46563.

SYSTEMS PROGRAMMER III

University of New Hampshire has an immediate opening for an experienced systems programmer with a minimum of 5 years experience on large-scale, time-sharing system, 3 years of which must be in operating systems work, or equivalent combination of education and experience. Responsibilities include monitor generation and maintenance, performance analysis, and operating system modification. Experience with DEC system-10 highly desirable. If you meet the qualifications, please send resume by August 31 to:

Mr. Richard Schofield
University of New Hampshire
Computer Services, Kingsbury Hall
Durham, New Hampshire 03824
An Equal Opportunity/Affirmative Action Employer

INFORMATION SYSTEMS and COMPUTING
3 Management Positions

Director—Division of University Information Systems

responsible for development of multi-year Administrative Information Systems plan for University coordination of policy making, policy implementation, planning and plan implementation for University administrative information systems — experience in managing large organization, technical competence in computing and systems planning.

Director—Division of Information Management

responsible for developing central administrative information systems plan, coordinates central management information needs assessment and the collection and provision of information for central planning, policy-making, management direction and control, and reporting — management experience and competence in management analysis, organizational planning, systems analysis.

Director—Division of Computing

responsible for operation of two central data processing centers and coordinates planning, resource allocation, evaluation and review of University computing facilities — management experience and competence in computer technology, networking, data processing operations.

$26-39K, Experience in academic institution preferred. Send resume by 8-15-76 to Bernard Sisco, Acting Special Assistant to the President, 681 University Hall, University of California, Berkeley, 94720. *Equal Opportunity, Affirmative Action Employer.*

IBM DOS
SOFTWARE APPLICATIONS
PROGRAMMER ANALYSTS

Due to overall and solid growth of our OKLAHOMA CITY data center, we are currently interviewing professionals to enhance our development efforts.

We are a national computer company that offers very real management and financial opportunities and would invite inquiries at all levels to discuss our present and future company direction and how you might fit in.

We specialize in the banking industry and have immediate positions available for experienced individuals. IBM DOS COBOL or Banking applications experience is our prime requirement. Please direct your inquiries or resumes to:

RON SLAMA (405) 236-4331

NATIONAL SHARE DATA CORP.

A Western Union Teleprocessing Division
120 Robert S. Kerr, Suite 1100
Oklahoma City, Okla. 73102
Equal Opportunity Employer M/F

SANDY JONES
Speaks Your Language . . .

Sandy Jones has talked to the major corporations. She knows where the great EDP openings and EDP dollars are — for analysts, reps, programmers, managers.
Now, Sandy Jones wants to talk to you. With 10 years in systems, Sandy Jones can speak your language.
CALL: Ask for Sandy. (Or send resume in confidence)

(203) 838-4188

EDP Career Opportunities, Inc.
149 East Avenue
Norwalk, Ct. 06851
Affiliates in 8 major U.S. cities including Hawaii
(Fees 100% paid by company)

COLORADO STATE UNIVERSITY

CSU is seeking Senior Systems Analysts and Analyst/Programmers to contribute to state-of-the-art research and development activities at CSU. Required are an M.S. in Engineering, Mathematics or Computer Science and at least six years experience in the data processing field with project-oriented developmental work in engineering simulation or modeling. Applicants should have experience with a wide range of systems, software languages and hardware mainframes. Present Computer Center resources include a CDC 6400 and CYBER 172, supporting batch, RJE and TS; graphics and microfilm. CSU, with an enrollment of 18,000, is located in a rural setting at the foot of the Rockies. Refer applications, including salary history, to Thomas McCall, University Computer Center, Fort Collins, Colorado 80523.

*An Equal Opportunity/
Affirmative Action Employer*

DATA PROCESSING MANAGER

Data processing manager wanted to head up data processing for physician's clinic in north central Wisconsin. Applicant should have experience with Burroughs medium systems, and M.I.S. including on-line systems data communication and data base management. Prior programming experience desired. Competitive salary with exceptional benefits and living conditions. Please send resume including salary history to: Personnel Manager, Marshfield Clinic, 1000 North Oak Ave., Marshfield, Wis. 54449. *Equal opportunity employer M/F.*

SYSTEMS PROGRAMMER RESEARCH ANALYST

The St. Paul is seeking minicomputer Systems Programmer with Assembler language experience to participate in Operating System and communications research and planning for Datapoint minicomputers.

Position offers attractive salary and a comprehensive benefit package. Convenient downtown St. Paul location. For further information call 1-800-328-9480, or send resume to: Employee Relations Department

St. Paul Fire and Marine
Insurance Company
385 Washington Street
St. Paul, Minnesota 55102

The St. Paul

An Equal Opportunity Employer

Coordinator of Time-Sharing Services

Western Illinois University has an immediate opening for an MICC Coordinator. MICC (Mid-Illinois Computer Cooperative) is a cooperative time-sharing network serving 5 major Illinois universities. Duties include consulting with students and faculty concerning software problems, conducting user training seminars, developing new applications, and representing WIU at Coordinator meetings. Minimum requirements include a bachelor's degree in Mathematics, Statistics, Computer Science, or a closely related field (master's degree preferred), expert knowledge of several languages (FORTRAN a must), working knowledge of applied statistics, experience with time-sharing, and 2-3 years of related experience, preferably in a university environment. Knowledge of SPSS and CDC hardware and software a plus.

This is a 12-month, administrative position. Salary to $18,000.

Send resume and references to: Mr. Tate Lindahl, Computer Center, Western Illinois University, Macomb, Illinois 61455, (309) 298-1177.

Deadline for applications: August 27, 1976

*An Equal Opportunity/
Affirmative Action Employer*

SYSTEMS PROGRAMMER

- MVS experience highly desirable.
- Familiarity with OS internals essential.
- Computer science degree or 2 years experience.

INTERNATIONAL SOFTWARE SUPPORT

(Princeton-based)

- Responsible for software product support and training.
- Extensive international travel (over 50%).
- Experience with systems programming (IBM 360/370).
- Some classroom experience helpful.
- COBOL required (1-2 years).
- 360/370 hands-on experience required.

Applied Data Research, a leader in the software products industry, is expanding its professional staff and offers challenging career opportunities with growth potential.

*Please forward complete resume
and salary requirements to:
SPD, Personnel Director*

APPLIED DATA RESEARCH

Route 206 Center, CN-8, Princeton, N.J. 08540
(609) 921-8550
An Equal Opportunity Employer

National Software Support Manager

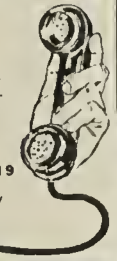
If you have been debugging operating systems software problems for at least 5 years and can point to 3-4 years of solid line management or project leader experience in a software environment, we can offer you the opportunity to become the National Manager of our Field Engineering Software Technical Support Group.

You will be responsible for the software debugging of new and existing products, interfacing with hardware and software development groups, as well as researching and analyzing field software problems. You will recruit, train, and motivate highly sophisticated software specialists. This position will be of particular interest to you if you desire to maintain your own state-of-the-art technical expertise.

When you are selected for this position you will be working for a well-known, aggressive minicomputer company.

Send your resume complete with salary history, in confidence to **CW Box 4732
797 Washington St.
Newton, Mass. 02160** An Equal Opportunity Employer.

PROGRAMMERS



DIAL
(800) 543-7583

For a unique, challenging position. As a professional consultant.
Ask for Loretta
or send resume to:
Box CW 1468
810-7th Ave, N.Y. 10019

An Equal Opportunity Employer M/F

At Robert Half we're as selective in our referrals as you are in your hiring.

After all, both our reputations depend on it.

Because our counselors have accounting, banking and data processing credentials, we're better at evaluating your job requirements as well as a candidate's qualifications. Results? You see only the people who are best for you.

R-H®
ROBERT HALF
PERSONNEL AGENCIES

World's Largest Finance and EDP Personnel Specialist.

Offices in the United States, Canada and Great Britain.

PROJECT ENGINEER

*Computer Applications
To Engineering*

Our Engineering Services and Testing Laboratory is seeking an individual with a degree in Math, Computer Science, or Engineering to work as a project engineer in the application of computer techniques to engineering R&D and laboratory operations. Knowledge of CDC 6600 and FORTRAN plus 3-5 years experience in engineering applications and math modeling required.

An excellent salary, paid benefits, plus room to advance your career are just part of what we have to offer you. To find out more, send your resume in confidence to:

Personnel Department-C **OR CALL: (516) 589-6300**

DAYTON T. BROWN INC.

Equal Opportunity Employer m/f Church Street Bohemia L.I., N.Y. 11716

CONSULTING & SOFTWARE DEVELOPMENT

American Management Systems is a nation-wide computer systems consulting and software development firm with over 225 employees with headquarters in the District of Columbia, with regional offices in New York, Chicago, Detroit, and San Francisco. We provide computer systems design and implementation services to many of the country's Fortune 500 firms, state and local governments, and federal clients. Areas of work encompass municipal finance, personnel/payroll, retail merchandising, inventory management, accounting systems, hardware/software analysis, and proprietary software development.

We have the following positions available in our Arlington and Chicago offices:

- JUNIOR PROGRAMMER/ANALYSTS — A Bachelor's degree in computer science or a related discipline or two years of relevant programming experience. Knowledge of COBOL and OS/JCL is required.

- SENIOR PROGRAMMER/ANALYSTS — junior level requirements plus three years of detailed design and implementation experience. Some exposure to teleprocessing software and/or packaged data base management software is desirable.

- DATA BASE SOFTWARE SEECIALISTS — same requirements as for Senior Programmer Analysts, plus hands-on experience with one of the major DBMS packages (IMS, ADABAS, TOTAL, System/2000). Positions available for both analytical work (hardware/software requirements analysis) and implementation projects.

- SOFTWARE DEVELOPMENT — same requirements as for Senior Programmer Analysts plus hands-on experience with mini computers.

We provide an exciting and challenging environment, rapid growth and professional advancement, and excellent salary and benefits. If you would like to join us, please send your resume (no calls, please) with salary requirements, past and current employment, education, and employment objective (if you have a geographical preference, please so indicate) to:

ams

Fred L. Forman
Director of Professional Recruiting
American Management Systems, Inc.
1515 Wilson Boulevard
Arlington, Virginia 22209

An Equal Opportunity Employer M/F

programmers

and programmer/analysts . . . here are the most and best opportunities for career advancement!

The demand for your services is greater right now than ever before. And we can show you more opportunities than you could find elsewhere, both locally and nationally.

Your career deserves professional guidance. So contact the NCA office in your area. There is no charge to you . . . ever!

National Computer Associates

CHICAGO
McCormick & Associates, Inc.
386 North York Street
Elmhurst, Illinois 60128
CLEVELAND
McCormick & Associetes, Inc.
801 Rockwell Avenue
Clevaland, Ohio 44114
DALLAS
Data Processing Careers, Inc.
Suita 1109
Stemmons Tower West
Dallas, Texas 75207
DETROIT
Electronic Systems Personnel
1705 Fishar Building
Detroit, Michigan 48202
FLORIDA
Data Sciences Parsonnal, Inc
Suite 205
15490 N W 7th Avenue
Miami, Florida 33189
HARTFORD
Compass, Inc
900 Asylum Avenue
Hartford, Connecticut 08105
LOS ANGELES
TaCS, Inc
3440 Wilshire Boulevard
Suite 1007
Los Angeles, California 90010
MINNEAPOLIS/ST. PAUL
Electronic Systems Personnel
801 Nicollat Mall, Suita 1718
Minneapolis, Minnesote 55402
NEW YORK
Botal Associates, Inc.
405 Lexington Avenua
New York, New York 10017
NORTH CAROLINA
TaskForce, Inc.
Consultants for Employment
1046 E Wendover Ave
P O Box 6888
Greensboro, North Carolina 27405
PITTSBURGH
Electronic Systems Personnel
108 Lawyers Building
428 Forbes Avanue
Pittsburgh, Pennsylvania 15218
PROVIDENCE
Xavier Associates, Inc.
10 Dorrenca Street
Providence, Rhode Island 02903
SAN FRANCISCO
The Computer Resources Group
Agency, Inc.
303 Secremento Straet
San Francisco, California 94111
SYRACUSE
CFA Associates Personnel, Inc
(Agency)
2530 James Straet
Syracuse, New York 13208
TULSA
Data Processing Careers, Inc.
Suite 10, Park 21 Building
2626 East 21st Street
Tulsa, Oklehoma 74114
WASHINGTON, D.C.
ESP Systems Corporation
Suita 210
1211 Connecticut Avenue N W
Washington, D C. 20036

DATA PROCESSING

FRENCH LANGUAGE CAPABILITY FOR ALGERIAN ASSIGNMENT

Major U.S. consulting firm under long term contract with the Algerian government has September and October requirements for EDP personnel experienced in IBM 370, Honeywell, Burroughs, Xerox hardware and specializing in ANS-COBOL/Fortran 4. Openings include needs for:

PROGRAM MANAGER

EDP MANAGERS or SUPERVISORS

SENIOR and JUNIOR ANALYSTS

SENIOR and JUNIOR PROGRAMMERS

TELECOMMUNICATIONS EXPERT

OPERATIONS RESEARCH EXPERT

HARDWARE EUVALUATION EXPERT

TRAINING SPECIALISTS

(EDP PLANNING, LANGUAGES, MANAGEMENT DISCIPLINES, HARDWARE, SYSTEMS)

Senior classifications require 10 years experience minimum, junior classifications 5 years experience. Candidates must possess Bachelor's Degree, MBA or equivalent desirable. French language facility a plus. Successful candidates will be located in Algiers for periods of 1 to 2 years with option to extend. Interviews will commence immediately. Remuneration commensurate with qualifications plus overseas allowance plus other benefits. Please provide a complete detailed resume including current earnings to:

CW Box 4728
797 Washington St.
Newton, Mass. 02160

An Equal Opportunity Employer, M/F

Systems Programmers

University of Iowa Computer Center has openings for computer programmers experienced in IBM OS/MVT/HASP or CDC CYBER/KRONOS operating systems internals and assembler language. Masters degree or equivalent experience required.

R & D PROJECT LEADER — requires extensive experience in computer operating systems design and Internals. Additional experience in minicomputer operating system design is desirable.
$15-18,000 per year.

SR. SYSTEMS PROGRAMMER — requires extensive experience in operating systems internals. Experience in teleprocessing, performance monitoring, and/or DBMS internals is desirable.
$14-17,000 per year.

SYSTEMS PROGRAMMER II — requires assembler language experience. Experience in operating systems, interactive systems, and/or teleprocessing is desirable.
$12-14,000 per year.

Submit resumes by August 23 to:

University of Iowa
Computer Center
Lindquist Center for Measurement
Iowa City, Iowa 52242
Attn: Mr. Lee Shope

An Equal Opportunity Employer

Data Processing Opportunities

DATA BASE SOFTWARE ANALYST

We have a challenging position in our technical services area which requires detailed analysis and maintenance of data base software and procedures. Consulting with application programmers relative to data base design and programming techniques for effective utilization of DB software is also involved.

The successful applicant should have:

- In-depth working knowledge of Cobol, ALC and Univac virtual systems
- Ability to work with minimal supervision

We offer an excellent benefits package, lovely suburban setting, free parking and day-care option is available.

Send resume with salary requirements to:

Cindy Fox
Personnel Department

CONNECTICUT GENERAL LIFE INSURANCE COMPANY
Bloomfield, CT 06152

An Equal Opportunity Employer m/f

EDP AUDITORS

Manufacturing client seeks experienced EDP Auditor — familiar with data base, access by authorized persons — systems validation — control procedures to $22,000. Insurance background EDP Auditor to $16,500; Banking — prefer CPA $16,000+ or—

ALL FEE PAID
Contact Ed Perry, Jr.

ROBERT HALF
PERSONNEL AGENCIES
680 South 4th St.
Louisville, KY 40202
(502) 589-6657

FACULTY POSITION

PH.D. or equivalent with teaching responsibilities in COBOL, Fortran, structured programming, systems analysis, data base techniques, and access methods and data structures. Rank and salary depending on qualifications. Submit resume postmarked no later than Nov. 15, 1976, to: Dr. Robert H. Holland, Head, Dept. of Operations Research and Information Systems, College of Business, Eastern Michigan University, Ypsilanti, MI 48197.

Equal Opportunity
Affirmative Action Employer

Programmer Analyst

If you're a problem solver, ready for Independent responsibility, you'll find the challenge and opportunity you want with this major NYC educational publisher.

Responsibilities include: new programming for bibliographic processing and maintenance of existing programs complete with coding, testing and documentation.

Qualifications: Bachelor's degree or equivalent, a minimum of 1 year computer utilization in problem solving, and knowledge of COBOL plus Assembler language. Bibliographic data experience desirable.

Salary $15-17K, depending on experience, plus outstanding benefits. Please send resume to:

CW Box 4730
797 Washington St.
Newton, Mass. 02160

Equal Opportunity Employer M/F

THE UNIVERSITY OF MICHIGAN SYSTEMS AND PROGRAMMING ANALYSTS

CHALLENGING opportunities are available to design and implement major integrated Data Base/Data Communication systems encompassing all phases of University administration for over 40,000 students and more than 14,000 full-time faculty and staff.

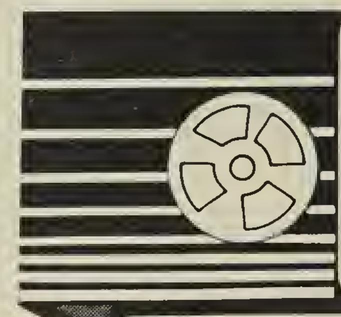
BENEFITS include:

- Competitive salaries and staff benefits
- Relocation expenses
- Annual vacation of five weeks plus holidays
- Suburgan living (population 100,000) with easy access to a full range of summer and winter recreation areas
- Excellent schools/housing and variety of shopping areas for family needs
- University cultural events, including national theater companies and international musical groups
- Big Ten and professional athletic events, plus staff access to University athletic facilities
- Educational assistance, including tuition aid and paid time off for course work at the University of Michigan and other area education institutions
- Extensive training and career development opportunities within the Data Systems Center
- Association with a large staff of experienced data processing professionals.

If your QUALIFICATIONS include two or more years of administrative systems experience (IMS background is a plus), send resume to:

THE UNIVERSITY OF MICHIGAN
Office of Professional and Administrative
Staff Services
1020 "J1" LS&A Bldg.
Ann Arbor, MI 48109

a non-discriminatory, affirmative action employer



National CSS is a multinational corporation supporting a broad range of customer-defined services in remote computing. Our success at applying modern computer technology to the problems of the business environment has created the following growth opportunities:

SALES REPS

NYC/PHIL/DETROIT

The individual we seek should possess software and time sharing experience coupled with a successful track record, including applications oriented sales. College degree required. Salary + comm + bonus.

TECH REPS

NYC/L.A./SAN FRAN/ATLANTA/PHIL

Your special expertise will be used to your advantage and ours with our technical sales support staff. You will be called upon for demonstrations, presentations, training and client support. This position requires a minimum 2 years DP experience; working knowledge of 3 languages; experience in a variety of business applications; and a college degree.

PRODUCT MKTG

NORWALK, CONN.

This is a challenging opportunity for an individual able to plan and develop a line of products for FORTRAN/GRAPHICS users. You will assume complete responsibility including technical quality; documentation; training; planning; and gathering competitive information. 5 years experience in field marketing and heavy background in FORTRAN and GRAPHICS required.

We offer an excellent starting salary and a comprehensive fringe benefits package. For prompt consideration, please forward your resume with salary history in confidence to:

Ms. Nancy Potenza
Corporate Headquarters

NATIONAL CSS INC.
542 WESTPORT AVENUE
NORWALK, CONNECTICUT 06851

An Equal Opportunity Employer M/F

HONEYWELL
Computer Specialists

We need Immediately, Honeywell Software Specialists who have experience in any of the following areas:

• GCOS • GMAP • TDS • TPS-TDS CONVERSION.

Manpower Planning Specialists are also needed who can plan and design the organizational and manning requirements for large EDP organizations.

Send Resume in confidence or call:

ITC
Personnel Department, Room 113
99 East Magnolia Blvd.
Burbank, Calif. 91502
(213) 849-4681
Equal Opportunity Employer M/F

DATA PROCESSING ADMINISTRATOR:

$16,000-$20,000 Challenging position for qualified individual to supervise operations of a county wide data processing system. Bachelor's Degree in accounting, data processing or related field plus 4 years experience is essential. Forward resume to Personnel Administrator Pasco County, P.O. Drawer 609, Port Richey, Fl. 33568.

MIS DIRECTOR

Multi-line insurer is looking for their No. 1 D.P. Professional to direct a staff of 50 including systems, oper's, prog's. Position will lead to div. Director. Candidate must have executive mgmt abilities. Salary to $20,000. Contact Stan Durbas

ROBERT HALF
PERSONNEL AGENCIES
111 Pearl Street
Hartford, Conn. 06103
(203) 278-7170

OPPORTUNITIES IN THE PACIFIC NORTHWEST

Computer Systems Manager for RSTS-E Operating System.

Nationwide leader in information systems technology has position available for qualified individual as Operating Systems Manager for large dual PDP 11/70's used for MIS and product development. If you have 2-5 yrs. experience which you believe will qualify you, send resume and salary requirements immediately. In addition to being ideally located this company offers excellent fringe benefits. Mail reply to:

Personnel Department
P.O. Drawer 2727
Spokane, WA. 99220
An Equal Opportunity Employer

DP CAREERS
Greater SW Area

PARS	$18-24M
EDP Auditor	$20-25M
MINI Systems	$20M
OS Programmer	$14M
Stairs-ATMS	$20M++
OS-MVT Sysgen	$18M
CFO-2 etc.	open
BOMP-MRP	$18-22M

Many other openings in Ariz., Colo., N. Mex., Utah, Kansas, Texas, Missouri, Arkansas, Louisiana, Miss., & Tenn.

Suite 200, 2401 NW 39th
Okla. City, OK 73112
(405) 525-8833

EDP SEARCH

Data Systems Analyst

Positions require ability to work with diverse Public Health Program areas in conducting systems feasibility studies; developing specifications for use by programmers in a State Data Center; developing testing methodologies to assure responsive design and installation, and conducting post-systems evaluation. The positions are located in Lansing, Michigan. A Bachelor's Degree with three or more years related work experience or a combination demonstrating ability is required. Salary range is $13,175 to $17,601. Social Security Number is a necessity. Send applications to: Recruitment, Dept. of Civil Service, P.O. Box 3002, Lansing, MI 48913. *An EOE*

PROGRAMMER ANALYST

Three years' experience in analysis and programming using COBOL and DOS/CICS required. BAL experience desired. Salary Range: $12,948-$15,792 per year plus excellent fringe benefits. Apply: The Metropolitan Community Colleges, 560 Westport Road, Kansas City, Missouri 64111 (816) 756-0220.

An Equal Opportunity/
Affirmative Action Employer

COMPUTER PROCESS CONTROL ENGINEER

We offer a unique opportunity for an Electrical/Electronics Engineer to coordinate and supervise both the design and application of real time computer systems utilizing sensors for all functions.

Qualified applicants will have a master's degree in Computer Science or at least five years experience with servo systems for process control utilizing A to D and D to A converters with real time computer control and process optimization.

We are a major gravure printer and offer an excellent compensation and fringe benefit package and, most importantly, career growth opportunity.

Send complete resume with salary requirements in confidence to:

CW Box 4729
797 Washington St.
Newton, Mass. 02160
An Equal Opportunity Employer M/F

Programmer

COBOL PROGRAMMER ANALYST

Minimum 3 years experience on IBM 370 equipment DOS/VS. Emphasis on business applications necessary. College degree preferred. Please forward resume to:

J. T. WYLIE

J.E.
SIRRINE CO.
ENGINEERS
P.O. Box 5456
Greenville, S.C. 20907
(803) 298-6597
An Equal Opportunity Employer M/F

Not just a recruitment ad.

It's a challenge. And a very unique one at that. As you probably already know, Memorex is back on track . . . and like never before. We've just completed a succession of record quarters in both sales and earnings. And the demand for Memorex products is at an all-time high. So what's the challenge? Memorex Project '76 . . . an ambitious product development program designed to transform Memorex's turnaround momentum into unquestioned technological and market leadership. The people who will turn this challenge into achievement are not people who answer recruitment ads. They are people who respond to challenge . . . people who want more out of a job than a paycheck. If you've read this far, that might be you. If you would like more information about joining the Memorex Project '76 Team, there are three things you can do. Send us the coupon, call our information hotline (408) 987-3800, or send us your resume. We are an equal opportunity employer M/F.

MEMOREX
TEAM76

Project '76 Team Positions Include:
Senior Logic Design Engineers ☐ Mechanical Engineers ☐ Microprogrammers ☐ Add-on Memory Engineers ☐ Datacommunications Engineers ☐ Magnetic Head Engineers ☐ Systems Programmers ☐ Display Terminal Engineers ☐ Magnetic Recording Circuit Engineers ☐ Ceramic Process Engineers ☐ Peripheral Interface Specialists ☐ Mechanism Designers ☐

Memorex Project '76 Team
Memorex Corporation
San Tomas at Central Expressway
Santa Clara, CA 95052

CW

Name ____________________
Address ____________________
City, State, Zip ____________________
Phone __________ Occupation __________
Employer __________ Years Experience __________

HARRIS CORPORATION

Data Communications Division, a concept oriented leader in data communications, the fastest growing segment of the computer industry, seeks the following Professionals:

Systems Analyst

Baltimore Area

Requires 4 years experience with ASSEMBLY level development. Several ASSEMBLY languages are desirable. Will be responsible for mini-computer software development, custom applications and support.

Computer Hardware Sales

Pittsburgh, Chicago, Dallas, New York City

You should have computer equipment sales experience and a thorough knowledge of data communications. Our products include: communication processors, remote batch and conversational terminals . . . all with a wide range of interface and operational modes.

For our Divisional Headquarters in DALLAS, we seek :

Systems Programmers and Software Support Specialists

You should have a degree and two plus years ASSEMBLY language Systems Programming experience in one or more of the following areas:

- Operating Systems
- Source Data Entry/Inquiry Response Syst Systems
- Data Communications
- Preferably in a synchronous communications environment

Product Marketing/ Planning Specialist

To provide Product Marketing support including competitive analysis and market forecasting. Position requires 3-5 years software and applications experience in the Data Entry and Distributed Processing market. Field Marketing and/or Marketing support experience preferred.

Training Specialist

You will develop and coordinate high quality sales and programming classes, adapt and implement class content and instructional techniques. Knowledge of operating Software Systems, OS, COBOL, and some sales background preferred.

Field Engineering Instructor

To teach remote batch maintenance to Field Engineers. The successful candidate will be knowledgeable in the techniques of instruction and will have maintained computer equipment.

At HARRIS, you will be working with TOP communications specialists in a highly technical environment for a company large enough to afford you the opportunity to learn and grow, but small enough to insure that your personal achievements will be recognized and rewarded.

For prompt consideration, please send your
complete resume including salary history
and requirements to: TOM BRYAN

HARRIS COMMUNICATIONS AND INFORMATION HANDLING

HARRIS CORPORATION Data Communications Division
P.O. Box 44076 Dallas, Texas 75234
OR call him COLLECT at: (214) 620-4191
an equal opportunity employer m/f

SYSTEMS PROFESSIONALS

CNA, an imaginative and innovative insurance organization is installing a $26 million IBM 370 computer system that will be the most modern in the insurance industry and seeks several key systems professionals. We prefer individuals who are dedicated to career advancement and desire to be involved in the development of state of the art systems and applications. We operate in a MVS 158MP/168MP, IMS, TSO, RJE environment and seek:

SYSTEMS CONSULTANTS AND ANALYSTS

At least 3-5 years of systems experience in an Insurance or Financial Services business.

In these positions we prefer you have experience in Management Information Systems or Insurance Processing Systems for Casualty, Personal or Commercial Lines. You should also be able to communicate effectively with all levels of management and systems personnel.

SENIOR PROGRAMMER/ANALYSTS

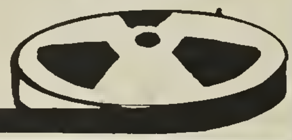
Experience in implementation of an on-line Life Insurance Processing Systems. The ideal applicant will possess in-depth Life Insurance experience, with emphasis on Policy Holder Service or Actuarial and a strong technical background which includes proficiency in BAL, COBOL and OS-JCL.

DATA BASE/DATA COMMUNICATIONS ANALYST

Practical experience with IBM equipment, data base processing capabilities and IMS access methods. You'll provide technical support to application development and operations areas in their use of IMS. The ability to provide design support in the data base and/or data communication areas of IMS is essential.

We offer an excellent salary plus generous benefits and relocation assistance for these positions in our modern and convenient Chicago loop headquarters. For immediate consideration, please send your resume with salary history to Employment Manager.

INSURANCE FROM
CNA
CNA PLAZA
Chicago, Illinois 60685
An Equal Opportunity Employer M/F



TERMINAL SYSTEMS DIVISION

Cambridge, Ohio

SYSTEMS ENGINEER

To plan and coordinate the development of systems software architecture for real-time microcomputer systems and the telecommunications software for both minicomputer and large scale computer systems. Perform analysis and systems design including hardware/software trade-offs with emphasis on software implementation. Will be coordinating with Marketing to determine customer needs and requirements relative to Point-of-Sale systems and telecommunications.

A degree and up to 5-8 years experience in real-time computer systems. Knowledge of high level languages- (FORTRAN, COBOL), etc., and of telecommunications disciplines — VTAM, BTAM, bisync, etc. Operating systems knowledge and experience desirable.

SYSTEMS DESIGN ENGINEERS

To analyze both hardware and software designs to guide effective system tradeoffs and determine system performance based on hardware/software constraints. Will provide design support to the product development groups.

A BS/MS degree with a knolwedge of both hardware and software development areas is required. In addition, experience in system formulation and proposal generation is necessary.

These positions will support the introduction of the next generation retail Point-of-Sale system and offer a highly visible work situation.

NCR's P.O.S. facility is located in a lovely, rural community in east central Ohio.

We invite you to join us and your inquiry is the first step.

Robert W. Donovan
Terminal Systems Division - Cambridge
NCR Corporation
Cambridge, Ohio 43725
Phone: (614) 439-0398

NCR

An Equal Opportunity Employer

Itty Bitty Monopoly

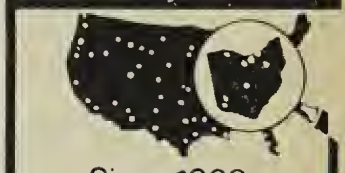
Customer Service Engineers

We're specialists in Ibm
"Customer Engineer" Extractions

Salary $1300-$1800/month

Bill Gill And Associates
5724 W. Diversey Av.
Chicago, Ill. 60639
(312) 622-7711

EDP Careers



Since 1968

Compu-Search has sought out exceptional individuals with Data Processing related skills for large and small companies throughout the United States and Canada. We also have been very successful in locating challenging new positions for thousands of people who have requested our assistance. If you are a talented achiever interested in hearing about situations that will best meet your goals, contact our office near you in complete confidence. We keep a close watch for the best opportunities available to you locally and nationally. Call for information.

Atlanta, Ga.	(404) 434-0300
Appleton, Wisc.	(414) 731-5221
Boston, Mass.	(617) 262-5050
Charlotte, N.C.	(704) 535-5220
Chicago, Ill.	(312) 697-2201
Cincinnati, Oh.	(513) 651-5500
Cleveland, Oh.	(216) 623-1030
Dallas, Tx.	(214) 630-3770
Denver, Co.	(303) 320-4221
Des Moines, Ia.	(515) 245-4490
Detroit, Mi.	(313) 569-2828
Erie, Pa.	(814) 454-2886
Greensboro, N.C.	(919) 375-4911
Harrisburg, Pa.	(717) 232-6771
Houston, Tx.	(713) 228-8671
Indianapolis, Ind.	(317) 257-4261
Lansing, Mi.	(517) 694-1153
Los Angeles, Ca.	(213) 930-1313
Louisville, Ky.	(502) 456-4330
Milwaukee, Wisc.	(414) 273-4430
Minneapolis, Mn.	(612) 339-7741
Newark, N.J.	(201) 325-1770
Omaha, Neb.	(402) 397-8115
Philadelphia, Pa.	(215) 665-9430
Rochester, N.Y.	(716) 325-1660
St. Louis, Mo.	(314) 731-6800
Stamford, Conn.	(203) 327-2030
San Antonia, Tx.	(512) 826-8666
San Francisco, Ca.	(415) 981-5950
Troy, Mi.	(313) 585-4200
Washington, D.C.	(202) 452-9100
Wichita, Ka.	(316) 263-4991

COMPU SEARCH

Div. of Management Recruiters, Inc.

BUY SELL SWAP

FOR SALE OR LEASE HONEYWELL

1 1251-2 49K CPU
1 0191 Opt. Inst
1 1114 Storage Protect
1 1120 Extended Multiprogramming & 8-Bit Transfer
1 213-3 Interval Timer
1 257 Disk Control
1 273 Disk Drive
1 204B-3 Magnetic Tape Unit - Primary
3 204B-4 Magnetic Tape Unit - Secondary
1 203B-1 Tape Control
1 050 Option
1 051 Option
1 214-1 Punch
1 223 Reader
1 222-3 Printer
1 032 Print Extension
1 220-3 Console
1 222-4 Printer

Available November 1976

Contact Jackie Majors

Computer Servicenters, Inc.
P.O. Box 1543
Jackson, Miss. 39205
(601) 969-9193

SHORT TERM LEASE
Available as
INTERIM SYSTEMS
To 138/148:

370/145 I-2
370/135
360/65

Contact Jim Hartnett
or Lou Skavienski

CIS

600 Mony Plaza
Syracuse, N.Y. 13202
(315) 425-1900

FOR SALE
360/44 w/ COMMERCIAL FEATURE

IMMEDIATE AVAILABILITY

RALPH GRAVES
214/630-6700

PCM
Pioneer Computer Marketing
1165 Empire Central Place
Dallas Texas 75247

BUY SELL

SELLING

MINI COMPUTERS
D.E.C. 11/34 August delivery
PDP-11/35, 11/40, 11/45,
8A, 8E & 8M
NOVA 1200, 1210, 1220
DISKS
Systems Industries Model 3500
Controller & Drives for PDP-11
Diablo 31 & 33F
CRT'S
Lear Siegler
Hazeltine

BUYING

Immediate cash for most mini computer CPU's and peripherals

Customers waiting for:
NOVA 840's - 1200's
D.E.C. 8E, 8M, 11/05 & 11/40

DATALEASE

700 No. Valley St.
Anaheim, CA. 92801
(714) 533-3920

FORSYTHE McARTHUR ASSOCIATES, INC

IBM Computer Dealer & Lessor

919 North Michigan Avenue, Chicago, Illinois 60611
312-943-3770 Telex 255161
Member, Computer Dealers Association

Unit Record Deals!

All types - instant delivery. Reconditioned, as is, or certified for SORBUS or IBM M.A.

Sell or Swap

Call Warner Rivera at (212) 557-3742

GENESIS ONE
COMPUTER CORPORATION
an MAI company

300 East 44th Street,
New York, N.Y. 10017

PCM

TO BUY, SELL OR LEASE: CALL **214/630-6700** **370-360 Systems I/O Card Equipment**

Pioneer Computer Marketing 1165 Empire Central Place Dallas, Texos 75247

FOR SALE
370/168-3

- New and ITC Qualifying
- October Availability
- Configuration Flexibility

CCA
Commonwealth Computer Advisers, Inc.
106 North Eighth Street
Richmond, Virginia 23219
(804) 643-9123

FORSYTHE McARTHUR ASSOCIATES, INC

FOR SALE/LEASE IBM 3333/3330 DISK

Type	Serial	Date Available
3330/11	24274	9/13-9/20/76
3330/1	24382	9/13-9/20/76
3330/1	24385	9/1/76
3330/11	24388	9/13-9/20/76
3330/11	24389	9/1/76
3333/1	40659	9/13-9/20/76
3333/1	40660	9/1/76
3333/11	42099	8/27/76
3333/11	42135	8/7/76

CALL OR WRITE

Member, Computer Dealers Assoc.
Forsythe/McArthur Associates, Inc.
919 N. Michigan Ave., Chicago, IL 60611
(312) 943-3770 Telex 255161

SALE OR LEASE
IBM Unit Record

024-$295	089-$1300
026-$1000	402-$900
029-$2200	403-$1000
046-$1800	407-$1500
047-$2300	514-$900
056-$195	519-$1200
059-$2100	526-$1750
077-$400	548-$2000
082-$900	552-$1200
083-$2200	557-$3500
084-$2500	602-$400
085-$1200	7330-$250
088-$2900	1401 System-$11,000

THOMAS COMPUTER
CORPORATION
Suite 4202A
600 N. McClurg Court
Chicago, IL. 60611
(312) 944-1401

SYSTEMS MARKETING INCORPORATED SMI
200 East Thomas Road • Phoenix, Ariz 85012
602) 264 5444 • Telex 667 334

Professional computer dealers in the West handling primarily purchase, sale or lease of 370/125, 135, 145, 3330 disks 3420 tapes, 3277 terminals.

Call us for your hardware needs. You'll appreciate our integrity, experience and financial strength.

Member CDA

FOR SALE OR LEASE

1—36 KQantel system 1200 & user 6+6 disc drive (12 million bytes)
3— 1728 character CRT's each with 4K memory module
1—45 CPS printer with keyboard

For Information Call
(212) 490-5916

SYSTEM/3
1130
360/20

BUY • SELL • LEASE

For a prompt, competitive quotation on your IBM needs, call or write today

"The Small Systems Specialists"

ECONOCOM
ECONOMIC COMPUTER SALES INC
1255 Lynnfield Road P O Box 17825
Memphis Tenn 38117 (901) 767-9130
TWX 810-591-1205
Member Computer Dealers Association

1130
1401

Systems & Components

BUY-SELL-LEASE-TRADE

CMI Corporation
23000 Mack Avenue
St. Clair Shores, Mich. 48080
(313) 774-9500
TWX 810-226-9708

Member Computer Dealers Association

3420's
3330's

Want to buy or sell 3420 tapes and controllers, or 3330, 3333's or 3830's? Call Bob Hogan with details for an immediate quote.

IPS
IPS Computer
Marketing Corp.
467 Sylvan Ave.
Englewood Cliffs,
N.J. 07632
(201) 871-4200
TWX 710-991-9677

MINI
COMPUTERS

Buying, Selling? Let us do the work for you and save you time and money!

AVAILABLE NOW:

Novas — most models — new & used; DEC 11s & 8s; Printers, disc drives; CRTs, etc.

WANTED

DEC & DGC Systems, CPUs & peripherals.
Buyers waiting for 8Es & 8Ms.

MINI COMPUTER EXCHANGE

(408) 733-4400
TWX 910-339-9272

WANTED

BURROUGHS

All Series
"L"
F500, TC700
10-10-361 TELLERS

NCR

31-32-41-42-43

IBM

370. . .System 32
all others

IOA
I.O.A. Data Corp.
383 Lafayette St., N.Y. 10003
(212) 673-9300
Member Computer Dealers Assoc.

---

145 & 158 WANTED

We wish to purchase 145's and 158's for delivery as soon as possible. Please call Dick Absher, Rich Thiele (145) Dave Tait or Ted Molinari (158)

IPS
IPS Computer
Marketing Corp.
467 Sylvan Ave.
Englewood Cliffs,
N.J. 07632
(201) 871-4200
TWX 710-991-9677

---

029 059 026

ALL IBM MANUFACTURED
Eligible For IBM
Maintenance Agreement
SPECIAL SAVINGS SALE
Call For Firm Quote

ALSO
082 083 514

Jim Carleton
CMI CORPORATION
23000 Mack Avenue
St. Clair Shores, MI 48080
(313) 774-9500

FOR SALE OR LEASE
370/125's

125G Avail Immed.
125GF Avail 9/1/76
125GF Avail 10/1/76
125H Avail 11/15/76

(with communications features)
Will Tailor to
Your Specifications

CC Corporate Computers, Inc
115 Mason Street
Greenwich, Conn. 06830
(203) 661 1500
Member Computer Dealers Association

---

buy sell lease trade

370 125 135 145s & • 3830/3333 • 3330/3340 • 3803/3420

360 30 40 50s & • 2314s • 2803/240Xs • I/O Sets

Sys 3 5406 5410 5415 & • 1403/5203 • 5444/5445 • 5496/9610

dataserv equipment inc.
6820 Shingle Creek Parkway, Minneapolis MN 55430
Vallco Financial Center, Suite 270
10050 North Wolfe Road, Cupertino, California 95014
Member, Computer Dealer Association

Toll Free (800) 328-2406
(612) 560-5450
In Western states call (408) 252-5700

To BUY • SELL • LEASE • TRADE

CSI

NEED TO BUY

IBM 3330 - 3333 - 3830 - 3420 - 3803
IBM 3271 - 3272 - 3277 - 3284 - 3286

Equipment is needed immediately and will pay top dollar. Owned or rental credit machines are acceptable.

AL SMITH
TENNY STANNARD
6111 1960 West
Suite 202
Houston, Tex 77069
(713) 444-0246

BILL McCAIN
BILL ROSELIUS
901 Office Park Plaza
Oklahoma City, Ok 73105
(405) 840-1911

KEN STEINBACK
JIM POWERS
11 South Meramec
Suite 1304
St. Louis, Mo 63105
(314) 727-7010

COMPUTER SALES, INC.
Member Computer Dealers Association

168
LEASE

Complete 168 available October 1976 for lease of 3 years or longer. Up to 6MB IBM core available. Call Ted Molinari.

IPS
IPS Computer
Marketing Corp.
467 Sylvan Ave.
Englewood Cliffs,
N.J. 07632
(201) 871-4200
TWX 710-991-9677

NCR CENTURY
SALE OR LEASE

32K, 450/900 lpm printer, Dual Disc, Card Reader & I/O Writer. Also, Freestanding Card Reader & Freestanding Card Punch. Contract negotiable, very reasonable terms & price.

Prof. Data Services
P.O. Box 306
E. Longmeadow, Ma. 01028

IBM UNIT RECORD EQUIPMENT

024 077 085 402 514 552 026
082 087 403 519 557 029 083
088 407 523 602 056 084 089
408 548 604 029 129

We Buy Sell or Lease
360s 1400s 1440s

IBM COMPUTERS

2040 GF, I/O Set
5 Spindle Calcomp 2314
6-60KB Tape Drives/Sims

Big Savings — up to 50% on Short Term Rentals

Call us for all your needs; we buy rent and sell all types of IBM unit record equipment. Over 12 years of serving commercial and government requirements. All equipment rebuilt at our own factory and guaranteed for IBM Maintenance. Contact ACS for proposal.

ACS
7126 Mullins
Houston TX 77036
(713) 666-2122
TWX 910-881-1526
NYC (212) 689-4747

EQUIPMENT CORP.

BUY — SELL — LEASE — BROKERAGE

Let the
"NATIONS LARGEST WHOLESALE DEALER"

Buy, sell, lease, sub-lease, or be your agent in placement of your pre-owned IBM 360/370/System 3, or other units

COMPUTER INTERNATIONAL, LTD.
CWC's international division —
experts in foreign markets, freight, customs

BEACH COMPUTER CORPORATION, CWC's Leasing Division
COMPUTER WHOLESALE CORP., (504) 581-7741
SUITE 507/508 FIRST NATIONAL BANK OF COMMERCE BLDG.
NEW ORLEANS, LOUISIANA 70112
MEMBER OF COMPUTER DEALERS ASSOCIATION

A New Service For The Used Computer Marketplace

COMPUTER EQUIPMENT INFORMATION BUREAU

FOR BUYERS: CEIB is a free, up-to-date source on current used equipment offerings that's as close as your telephone. Our equipment file includes over 4025 current listings from numerous brokers, dealers, and private sellers. Just call (617) 247-2290 to obtain immediate information on any specific systems or items you're interested in — including seller's names, asking prices, and availability dates.

FOR SELLERS: CEIB is an inexpensive, convenient approach to reaching potential buyers. If you haven't already received our brochure and listing forms, please write or call ---

CEIB — P.O. Box 163; Boston, MA 02117 — (617) 247-2290
R. Ferrara, President

BUYING

N.C.R. PHASE-OUT EQUIPMENT-
31, 32 and 441's
41, 42 and 43 BANK MACHINES AS WELL AS 151 and
152 ADDING MACHINES. ALSO 299 and 399 MINICOMPUTERS
BURROUGHS F-5000/6000 SERIES, L SERIES and 10-10-380 & 10-10-360
TELLER MODELS. FRIDEN 5005 COMPUTYPER
Also A Supplier of SELECT-USED Equipment From - BURROUGHS - I.B.M. - PHILIPS

BUYING OR SELLING - CALL US FIRST!

KEY-EXIMPORT CORP.
256 LIVINGSTON ST. (P.O. BOX 129) NORTHVALE, N.J. 07647
TELEX: 135149 CABLE: KEYEXIMP-NORTHVALENJ
TELE. N.J.
(201) 767-3444
N.Y.C. DIRECT LINE
(212) 736-7736

END USER
WANTS TO BUY
370/145 Model H2 (256K)*

- User to User Sale •
- No Brokers Please •

A committed END USER BUYER wishes to finalize sale with OWNER or PURCHASE OPTION ELIGIBLE USER at earliest time. Availability this year is a prerequisite.

Features:
1421, 2001, 3910, 4660, 4953
6982, 6983, 7855, 8810
3215-001
3047-001

**Other models will be considered.*

PLEASE REPLY TO: John M. Dickerson
South Carolina Electric & Gas Co.
Post Office Box 764 Columbia, SC 29218
(803) 799-1234 - Ext. 2427

---

165 FOR SALE / LEASE

Serial Number 60219

3165 KJ 2880 2
3066 1 2870 1
3067 1 2860 2
7074 Compat (6) 3360 5

DAT box optional
Available February 1977

Contact:
N. FLETCHER
(615) 755-1164

Principals Only No Brokers

FORSYTHE McARTHUR ASSOCIATES, INC

WANTED
IBM 2860/2 or 2860/1

- Delivery on or before 09/01/76
- Will buy or lease

CALL OR WRITE

819 North Michigan Avenue, Chicago, Illinois 60611
312-943-3770 Telex 255161
Member, Computer Dealers Association

BURROUGHS B3500

120 KB Core Memory
800 lpm Line Printer
(2) 800 BPI 9-Tr
Tape Drives
800 CPM Card Reader
20M Bytes Disk (20 ms)
Ernie Lucken
Diversified Computer Applications
2525 E. Bayshore Road
Palo Alto, Calif. 94303
(415) 324-2523

CARTRIDGE CONVERSION WANTED

Convert from 3M type tape cartridge (Scotch brand data cartridge D.C. 300A) recorded in proposed ANSI standard for 1/4" tape, to IBM-compatible 9 track tape, either 800 or 1600 bpi, EBCDIC.

Contact Mr. Fryer
Calculagraph Company
East Hanover, N.J. 07936
(201) 887-5000

---

155 J to K
UPGRADE

Available Now
Compatible With DAT
(Eliminate extra $30,000 installation charge.)

Please call John Delaney, Fred Cholette or Jim Hanly for details

CIS
CIS Corp.
600 Mony Plaza
Syracuse, N.Y. 13202
315/425-1900 Telex: 93-7435

135
CORE

All increments from FE (96K) to I (512K) available immediately. If your 135 requires more core, call Ed Joseph.

IPS
IPS Computer
Marketing Corp.
467 Sylvan Ave
Englewood Cliffs,
N.J. 07632
(201) 871-4200
TWX 710-991-9677

DATA COMMUNICATION TERMINALS

Attractive, low prices on off-lease terminals. ASCII, EBCD or Correspondence codes. 10 end 15 cps speeds.

Teletypes
TWX/DDD Terminals
AJ841 Selectronics

For details on price, service, and warranty contact your local AJ office or Don Reichel at:

ANDERSON JACOBSON
1065 Morse, Sunnyvale
California 94086
(408) 734-4030

System/3 Model 10 For Sale

5410 (16K) CPU
5424 MFCU
2X5444 disk (9.8 mil bytes)
5203 (200 LPM, 132 char.)

$42,000

Currently on IBM Maintenance
($492.50/month)
Available mid-November
Call - Glenn Moore
(203)366-3224

IN CANADA

We specialize in
360/20, 360/30 & up
System 3, 370 Series
We buy your excess
IBM Equipment
CMI Company
P.O. Box 893
Windsor, Ontario N9A 6P2
519-258-8910

BUY/SELL/LEASE/TRADE

IBM COMPUTERS
360's 370's, System 3
All types: 1401, 1440, 1130, 1620
Unit Record Equipment & Peripherals

DISK PACKS — ALL TYPES
Completely recertified.
Guaranteed immediate delivery, lowest prices.

DAC
DATA AUTOMATION COMPANY, INC.
4858 Cash Road, Dallas, Texas 75247
(214) 637,6570
Member Computer Dealers Association

PURCHASE/SALE/LEASE

ALL 360 & 370 SYSTEMS

360/30
360/50
1440
2311
360/25
360/20
360/40

CORPORATE COMPUTERS, INC
115 Mason St., Greenwich, Conn. 06830 (203) 661-1500
Member Computer Dealers Association

FORSYTHE McARTHUR ASSOCIATES, INC.

3333/3330 FOR LEASE

Type	Serial	Available
3333/1	40668	09/01/76
3330/1	24284	09/01/76
3330/1	24347	09/01/76
3330/1	24377	09/01/76

- 2 or 3 year lease
- Qualified for IBM maintenance
- Substantial savings

CALL OR WRITE

Member,
Computer Dealers
Assoc.

Forsythe/McArthur Associates, Inc.
919 N. Michigan Ave., Chicago, IL 60611
(312) 943-3770 Telex 255161

GO GREYHOUND

WHEN BUYING OR SELLING COMPUTER EQUIPMENT

FOR SALE:

370 FEATURES
3274 & 4640 for 3135
8100 for 3145
3210 Printer Keyboard

370 TAPES
1-3803-1 with 3551
4-3420-3 with 3550

U.S.	New York	Dick Ventola	(914) 949-1515
	Chicago	Pete Ahern	(312) 751-5430
	Dallas	M.W. "Bill" Tucker	(214) 233-1818
	Phoenix	Tom Takash	(602) 248-6037
	San Francisco	Henry Paulson	(415) 989-4023
International	Toronto	Don Maunder	(416) 366-1513
	London	Bruce Pearson	(01) 759-9191
	Geneva	Joe Gold	(022) 61-27-54
	Mexico	Andres Contreras	(905) 546-5179
	Asia	Don Haworth	(214) 233-1818
Non-IBM	Dallas	John Hallmark	(214) 233-1818

Greyhound Computer Corporation Greyhound Tower Phoenix, Arizona 85077

COMDISCO

The World's Largest IBM Computer Dealer

SELLING 3145I2 Nov. 1
3165KJ Nov. 1

LEASING 3165K2, 3155J2

BUYING 2040 2050 2065

WRITE:
Comdisco, Inc.
9701 Higgins
Rosemont, IL 60018

CALL:
312/698-3000
East: 201/568-9666
West: 415/944-1111

TWX 910-233-2478
Member Computer Dealers Association

COMDISCO COMDISCO

Money-back guarantee AND Discounts up to 80%

We've never seen a money back guarantee on used computer equipment before, but we are offering one now as an expression of the faith and confidence we have in this equipment. It's all been lightly used and is fully reconditioned and in tip top working order. Having pioneered the full 90-day warranty on used equipment we offer the same warranty as you would get on new equipment. Everything is completely documented and eligible for maintenance by the manufacturer.

CHECK THESE PRICES!

DATA 100/ODEC PRINTERS

Model	*Speed (LPM)*	*OEM List Price*	*NCE Price*
0ESK TOP UNITS			
1422	125	4144	2500
1423	250	4665	2950
FLOOR MODELS			
2422	125	4479	2700
2423/80	210	5000	2800
2423	250	5000	3100
2424	300	5500	3400

WHISPER OUIET OPTION
Add $300.00 to 14XX models,
$160.00 for 24XX models. Call for details.

INTERFACES (NEW) FOR	
POP11 & PDP8	$ 675
Nova/0CC116	700
Interdata & RS232c	750

Money-Back Guarantee

If the equipment does not meet customer expectations in any way, it may be returned — within three weeks from date of receipt — without penalty. The customer is responsible for shipping charges, installation and repackaging. In addition, our 90 day full parts and labor warranty applies.

PDP11 Memory

Manufacturer	*Model*	*Memory Size*	*NCE Price*
0EC	MM11-E	4K	$ 900
DEC	MM11-F	4K	900
0EC	MM11-K	4K	375
0EC	MM11-L	8K	1,000
PLESSEY or KERONIX		8K	800
0ATA 100/ CAL DATA		8K	900
DATA 100/ CAL DATA or PLESSEY		16K	1,700

CALL and RESERVE NOW — QUANTITIES LIMITED

Please complete coupon or attach business card and mail.

☐ Send more information ☐ Call me
☐ Add me to your mailing list

Name ____________________ Title ____________
Company ________________________________
Address ________________________________
____________________ Telephone ____________

NEWMAN COMPUTER EXCHANGE
1250 N. Main St. Ann Arbor, Mi. 48104
(313)973-1230

FORSYTHE McARTHUR ASSOCIATES, INC

WANTED IBM 3830/2

- Needed by 09/10/76
- Prefer feature 2150
- IBM Rental credit equipment will be considered

CALL OR WRITE

919 North Michigan Avenue, Chicago, Illinois 60611
312-943-3770 Telex 255161
Member, Computer Dealers Association

155

Available for sale or lease. August delivery. Up to 2 MB IBM or OEM memory. Call Dick Absher or Dave Tait.

IPS
IPS Computer
Marketing Corp.
467 Sylvan Ave.
Englewood Cliffs,
N.J. 07632
(201) 871-4200
TWX 710-991-9677

UNIVAC PRINTERS

600 LPM, with all new electronics, including complete interface for RS232, Interdata, Modcomp, Centronics, etc. as low as $2,500.

Sid Reichman
COMPUMATICS, INC.
327 S. LaSalle St.
Chicago, IL. 60604
(312) 922-9422
TWX #910-221-5619

3420's 3803's 3333's 3830's 3330's

SALE OR LEASE
ALL MODELS

Darryl Hastings
CMI CORPORATION
23000 Mack Avenue
St. Clair Shores, MI 48080
(313) 774-9500
Member CDA

FOR SALE Communication Terminals

- Teletypes - 28 32 33 35
- TWX - TELEX
- DECwriters LA36
- Acoustic Couplers & Hardwire Modems

DATA COMMUNICATION EQUIPMENT BROKERS, INC.
1878 Thunderbird Street
Troy, Michigan 48084
(313) 362-0470

ISI Marketing, Inc.
1401 Dove St.,
Suite 245
Newport Beach,
CA. 92660
(714) 833-9460
TWX 910-595-2550

FOR SALE OR LEASE
3333-11 Serial # 41042, 40966
3330-11 Serial # 22233, 20593, 10559, 13182, 20172, 70132

WANT TO PURCHASE
370 CPU's & peripheral equipment

CALL OR WRITE
John Langbridge Pete Daley

---

145 LEASES

Short-term (12-36) months 145 leases available. Call Dick Absher or Rick Thiele.

IPS
IPS Computer
Marketing Corp.
467 Sylvan Ave.
Englewood Cliffs,
N.J. 07632
(201) 871-4200
TWX 710-991-9677

ITEL WANTS TO

BUY: 370/158

SELL: 360/65
135, 145 Memory
135, 168 IBM Memory
Itel 2314 Dual Density Disk Drives
2401-5, 6's, 2804-2

LEASE: 2065, 2860-3, 2870-1, 2365's

CALL: **Linda Vaughn, Reenie McCarthy**
(415) 983-0220, (415) 983-0238

WRITE: ITEL Computer Products Division
One Embarcadero Center
San Francisco, Calif. 94111

ITEL CORPORATION

WANTED

ALL 360 AND 370 SYSTEMS
AND PERIPHERALS
WE BUY · SELL · LEASE · TRADE

transdata
Member Computer Dealers Association

P.O. Box 47762 Dallas, Texas 75247 PHONE (214) 631-5647

---

370 LEASE or SALE

145 HG2-I2 Memory
360/65
145-11518
135-61154

AVAILABLE NOW

-AUGUST-
158 Models K/KJ
155 W/WO DAT

AVAILABLE NOW

-145 I2-J2 Memory
-135 AMS Memory 128K
-158 I-JI Memory

Contact: R. Scoville

Computer Systems of America, Inc.
141 Milk Street, Boston, Mass. 02109
(617) 482-4671

buy sell swap | buy sell swap | buy sell swap | buy sell swap | buy sell swap

end user wants to sell

IBM 370/145 I2

Will consider sublease to ITC qualified user. Available September 27, 1976.

Please reply to:
Department of Data Processing
Box 36432
Dallas, Texas 75235

BEFORE YOU BUY, SELL, OR LEASE, TAKE A 'SECOND' LOOK

NOW

buying: 370/155 370/158 370/165 370/168

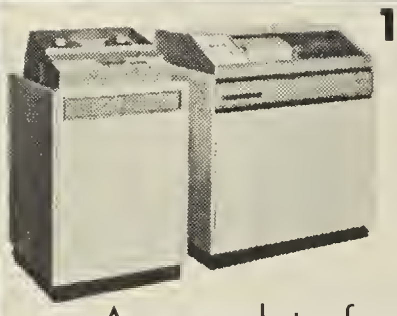
selling: 370/135 370/145 370/165 370/135 -145 Memory

leasing: 370/135, 370/155, 370/158

TLW COMPUTER INDUSTRIES INC.

ATLANTA 3570 American Drive, Atlanta, Ga 30341
404-451-1895 TWX 810-757-3654
CHICAGO 312-295-2030
WASHINGTON, D.C. 202-466-2470
LOS ANGELES 213-370-4844

AMERICAN USED COMPUTER CORPORATION



1403N-1 SPEED AT 20% OF THE COST!

A complete factory refurbished Off-Line

DATA PRODUCTS

1333 LPM Printer
with 7 or 9 track Tape Drive
Guaranteed Maintenance

★THIS IS A COMPLETE OFF-LINE SYSTEM★

$9500

NOW TOLL FREE
800-225-7640
In Mass. 261-1100
P.O.Box 68, Kenmore Station,
Boston, MA 02215

Member Computer Dealers Association

CMI Slashes Prices to Beat IBM Price Reductions

360/20

Nation's Leader

S/3

Components & Systems
Sell — Lease — Buy
CMI Corporation
23000 Mack Avenue
St. Clair Shores, Mich. 48080
(313) 774-9500
TWX 810-226-9708

Member CDA

Deal With Confidence
Ask a CMI Customer

NEED TO BUY IMMEDIATELY

IBM 1412

Magnetic Character Reader with 7720, S/360 Adapter
Offer Top Dollar

Computer Sales Int'l., Inc.
901 Office Park Plaza
Oklahoma City, OK 73105
(405) 840-1911

TERMINALS DATA ENTRY EQUIPMENT

KEYPUNCH SALE
026 . . . . $995.00
D29 . . . . $1495.00
029 . . . . $1995.00

DATA RENTALS/SALES INC.
2919 S. LaCienega Blvd.
Culver City, Calif.
(213) 559-3822

WANTED TO BUY

PDP #11-45

with minimum of 48K memory for immediate delivery.

Contact Erick Eulen
Consolidated Data, Inc.
1611 S. Hope St.
Los Angeles, Calif. 90015
(213) 747-2802

FORSYTHE McARTHUR ASSOCIATES, INC

IPC/6/80
BLOCK MULTIPLEXOR

- Available for lease or sale
- Minimum lease term two years
- Permits direct attachment of IBM 3330 equipment to an IBM 360/65
- Available September 1, 1976
- Priced below market

CALL OR WRITE

919 North Michigan Avenue, Chicago, Illinois 90611
312-943-3770 Telex 255161
Member, Computer Dealers Association

COMMUNICATION TERMINALS

with Data Entry
Key To Tape

WAS ~~$9710.00~~

NOW ONLY **$3000.00**

These Communication and Data Entry Terminals will definitely solve your problems if you need a low cost system that is proven successful. Just give us a call or drop us a line, and we will be glad to forward all information.

Call (214) 350-9934
or write
Transamerica Computer Co., Inc.
2639 Walnut Hill Lane
Dallas, Texas 75229

CANADA

We specialize in buying, selling and leasing large scale IBM equipment: 360/50 and 65, 370/135 and up. Call Ed Champagne. (Nous parlons Francais.)

IPS Computer Marketing Corp.
467 Sylvan Ave.
Englewood Cliffs, N.J. 07632
(201) 871-4200
TWX 710-991-9677

370/158-3

MODEL U34
1433 1434 1435
7840

AVAILABLE
MID-NOV
CALL BILL GANNON

FINALCO, INC.
(703) 790-0970

A MUST BUY

CMI Has an Order for Several
2203 A1 or A2
2501 A1 or A2
Call Pam Hoban

MUST SELL

(6) 2560 MFCM
Any Number of Print Lines
Call Mike Vargo

CMI CORPORATION
Nation's Leader in 360/20 Equipment
23000 Mack Avenue
St. Clair Shores, Mich. 48080
(313) 774-9500

D.G. NOVA 2/10

MODEL 2153

w/16K plus 16K memory, disc controller, printer, multiplexor, etc. Send for equipment list.

Navigate, Inc.
2076 Sunnydale Blvd.
Clearwater, FL 33515

NOVA 2/10s

32K core memory
Power monitor, auto re-start
Real Time Clock
TTY I/O interface for ASR 33, 35
Precision Crystal Oscillator
Asynchronous Mplex 4 line
Communication 4083 Connector
Auto Program Load

EASI Systems, Inc.
23077 Greenfield Rd.
Southfield, Mich. 48075
(313) 559-8350

SELL OR LEASE FAVORABLE TERMS

- GE 115
- 12K CPU
- 300 LPM Printer 136 Print Positions
- 2 Disk Drives 3M Character Disk
- 300 CPM Reader
- 200 CPM Punch

GOLDING BROS.
Div. of W.R. Grace & Co.
(212) 689-8300 Ext. 200

360/30
360/40
360/50

We Specialize
We Buy and Sell Any System or Peripherals

Equipment Normally Available from our Inventory within 2-3 weeks

Leases Available

- Brokers & Dealers -

Fill your retail deals at wholesale prices through CMI. We will configure full systems to your requirements.

CMI CORPORATION
23000 Mack Avenue
St. Clair Shores, Mich. 48080
(313) 774-9500

Member Computer Dealers Assoc.

SOFTWARE FOR SALE

D&B

presents

THE MOST HIGHLY RATED ACCOUNTS RECEIVABLE SOFTWARE SYSTEM . . .

MBE-ARMS, from Dun & Bradstreet's Fortex Data Corporation. Developed by CPAs, individually tailored by experts to fit your specific requirements, designed to satisfy the most demanding computer and money managers.

Call or write today for descriptive literature:

FORTEX
10 S. Riverside Plaza • Suite 1560-C
Chicago, Illinois 60606
(312) 454-1650

TAXBREAK

***

Payroll tax calculation module

***

Calculates payroll withholding taxes for 50 states, federal, FICA and cities. COBOL. $875 complete.

Maintenance service on tax changes available for $225 per year.

ARGONAUT INFORMATION SYSTEMS, INC.
2140 Shattuck Ave.
#205
Berkeley, CA. 94704
(415) 845-7991

PAYROLL PERSONNEL

Is $960 Too Cheap?

That's all we charge for our SUPER/PAY Payroll System

—All Cobol 48K or above
—Variable or fixed input
—Disk or tape IBM or others
—State and local taxes
—Unlimited deduction & earnings
—Vacation and sick leave acctg.
—Skill and education profile
—Outstanding documentation
60+ User-30 Day Trial

Occidental Computer Systems
10202 Riverside Drive
No. Hollywood, Calif. 91602
(213) 763-5144

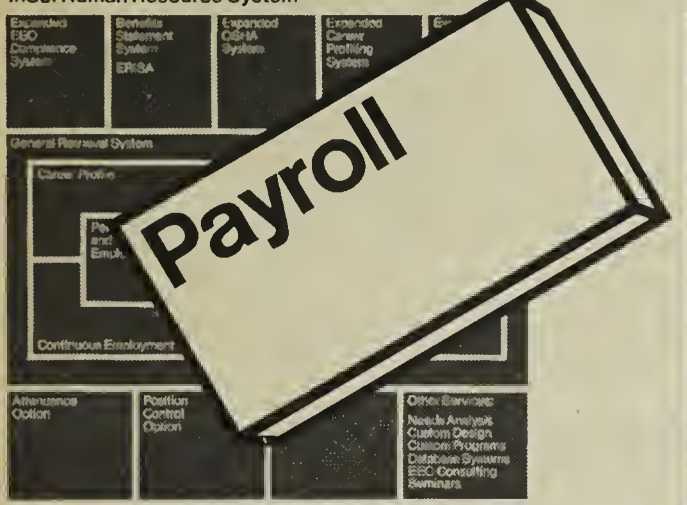
HASP-II PDP-II COMMUNICATION SOFTWARE

O.R.I, has HASP support for DOS, RT-11, RSX-11M, & RSX-11D

- RJE Terminal for HASP Centrals
- PDP-11 to PDP-11 communications
- Quantity and OEM Discounts
- Full Sources are available
- User Modules Easily Changed for special requirements

Call or Write for Further Details:
Software Marketing
Oregon Research Institute
P.O. Box 3196
Eugene, Ore. 97403
(503) 484-2123

InSci Human Resource System



Now for Payroll

A user-controlled system -- up and running fast.

- wide-scope processing
- table-driven
- 999 different earnings, taxes, deductions
- labor distribution module
- powerful retrieval
- comprehensive documentation manuals
- fully supported implementation
- integrated with Human Resource System

Offices in:
Montvale, New Jersey
Oak Brook, Illinois
San Antonio, Texas
Menlo Park, California

Please send me information on InSci Payroll!

Frank Cancro, Vice President

InSci

Information Science Incorporated
Dept. CW-M
95 Chestnut Ridge Road
Montvale, New Jersey 07645
201-391-1600

Name: ____
Title: ____
Company: ____
Address: ____
Phone number: ____

Payroll

There's nothing that can ruin employee relations faster than an inaccurate pay check. Except missing a payroll.

The MSA Payroll Accounting System will help you guard against costly manual interventions in your payroll system • 90 Deductions and Other Earnings • Complete Taxes With "Alltax"® • Flexible Report Writer • Cost/Labor Distribution • Bank Services Including ACH • Over 450 Users • Interfaces With M.S.A.'s Full Service Personnel Management & Reporting System Including ERISA, OSHA and EEOC

For further information contact Bill Graves at 404-262-2376 or mail this coupon.

MSA
THE FINANCIAL SOFTWARE COMPANY

Management Science America, Inc.
3445 Peachtree Road, N.E.,
Suite 1300, Dept. C-1
Atlanta, Georgia 30326
Chicago, 312-323-5940; Los Angeles, 213-822-9766; New York, 201-871-4700

Name ____
Company ____
Title ____
Address ____
City ____ State ____ Zip ____
Phone ____ Computer Model ____

I am interested in:
☐ Payroll
☐ Personnel Management and Reporting
☐ General Ledger
☐ Fixed Asset Accounting
☐ Accounts Payable
☐ Financial Information and Control
☐ Accounts Receivable
☐ Supplies Inventory Control & Purchasing

Move up to

ACCOUNTING IV.

General Ledger and Financial Reporting

Accounts Payable

Accounts Receivable

Three fully integrated financial application systems, proved during years of successful use. Totally ANS COBOL. Call or write today for details.

informatics inc
World's Largest in Software Products

65 Route 4, River Edge, NJ 07661

~~New York: (212) 564-1250~~
New Jersey: (201) 488-2100
Chicago: (312) 325-5960
Los Angeles: (213) 881-3722
Massachusetts: (617) 481-1180
Oregon: (503) 297-1932

System/3 General Ledger

- Financial data base
- Any chart of accounts
- Report Writer
- Allocations

Get MORE from your System/3

SOFTWARE INTERNATIONAL
Elm Square, Andover, Mass. 01810
(617) 475-5040

Q~PAC Payroll
Mightiest System of All

- Comprehensive tax module
- Customized personnel processing
- Most flexible report writer
- Powerful general ledger interface

Other financial systems:
General Ledger
Accounts Payable
Accounts Receivable

SOFTWARE INTERNATIONAL
Elm Square, Andover, Mass. 01810
(617) 475-5040

MMS Accounts Receivable

Eliminates the Long Wait.

- Database Design All Cobol
- Open Item or Balance Forward
- Multi-company
- Flexible Aging
- Simplified Cash Posting

SOFTWARE INTERNATIONAL
Elm Square, Andover, Mass. 01810
(617) 475-5040

TIME & SERVICES

Datacenter 370/158

3 meg VS2
Specializing in
Remote Job Entry
and Batch
Excellent Technical Support
Very Attractive Rates
Contact: Stu Kerievsky
(212) 564-3030
Datamor
132 W. 31st St.
New York, N.Y. 10001

Prime Time Available

360/50 - 256K

5/2314 - 4/180KB

Call: (212) 725-5775
Infologic
444 Park Ave. So. (30St)
New York 10016

COMPUTER TIME
IBM 370/125 (192K)

8 p.m.–7 a.m.
$32.50 per hour

(1) 1403 N1	(4) 3410 80 KB
(1) 2540	(6) 3340 420 MB
(2) 029-KP	(1) 083 Sorter

DOS/VS (R-31) POWER/VS
COBOL-FORTRAN-RPG II-ALC
ON-LINE CAPABILITIES

Looking for users of 50 hrs. or more per month..

Call P. Stanger
(301) 650-0500
Bethesda, Md.

Systems, Programming and Operating Services also available

I.B.M.-360'S

All shifts available on 4 - 360 computers with all features, 2314's, 2311's, 2402's - 800 BPI 9TRK, 2402's - 7TRK, 2401's - 1600 BPI 9TRK, 1403's - N1, 2540's, 2703 with ASYN & BISYNC Port.

Prices start at $35.00 per hour. We also offer complete Batch and Tele-processing services. Configuration can be modified to accomodate any 360 computer user. We have on site CE's.

UCS Computer Centers
Richard Mine Road
Wharton, N.J. 07885

Contact Bill Kersey at
(201) 361-4007
or
Joe Kelly at
(201) 361-4008

IBM 360/370 USERS
COMPUTER TIME AVAILABLE

370/158

4 meg, 3330 (32m), 2314 (16m), 12 3420-7dd tape. OS/MVT, RJE, TSO, CICS, ATS, DOS EMUL.

(3) 360/50's

512K, 2314 (8m), 6 3420-5dd, 1403, 2540

FOR
FURTHER INFORMATION
CALL RON ELLIS
(312) 346-1331

computer research company
200 N. Michigan Avenue
Chicago, Ill 60601

Whether you're buying, selling, swapping, hiring, or looking, Computerworld Classifieds work.

Issue Dates: *Computerworld* is issued every week dated Monday. We must have your ad in our office no later than the second Friday preceding the issue date. Please be sure to specify the section you want to place your ad in. Sections are: Turnkey Systems, Time and Services, Software for Sale, Position Announcements, and Buy/Sell/Swap.

Copy: If you have an ad agency, have them send us a camera-ready paste-up mechanical or a film negative of your ad. If not, we'll be happy to typeset your ad and prepare it for publication for no extra charge. Please attach CLEAN, typewritten copy with an indication of headlines and subheads, for boldface treatment. We'll set your ad to fit the size you specify, if possible.

Cost: Our rates are $49.70 per column inch. Minimum size ad is two column inches and costs $99.40 per insertion. Extra space is available in half-inch increments and costs $24.85. Box numbers are $1.00 extra.

Billing: Once your ad is ready, send it to us with the issue date(s) you want and the section you want to be in. If you're a first-time advertiser, we must have your payment in advance.

☐ I have enclosed my check. ☐ I would like to speak with a salesman.
☐ I would like further information, please send me a rate card.

Ad Size: ____ Issue Date(s): ____ Section: ____
Signature ____ Date: ____
Name: ____ Title: ____
Company: ____
Address: ____
____ Tel: ____

Send this form to: Pam Palmer, Classified Advertising, or Abby Purrington, Recruitment Advertising
COMPUTERWORLD, 797 Washington St., Newton, Mass. 02160

These securities have been placed privately with an institutional investor. This advertisement appears as a matter of record only.

$3,800,000

National CSS, Inc.

Senior Secured Note Due 1983
(Collateralized by an *Amdahl 470* Computer)

Paine, Webber, Jackson & Curtis
Incorporated

July 22, 1976

GO GREYHOUND

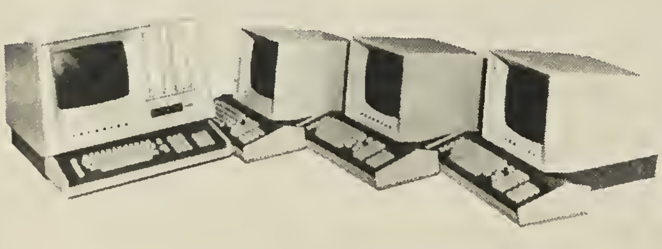
WHEN LEASING COMPUTER EQUIPMENT

AVAILABLE IMMEDIATELY:	360/30, 360/50, PHOENIX I/O TAPES, 2314 COMPATIBLE DISKS		
U.S.	East	Al Henson	(609) 665-5251
	Central	Jerry Rogers	(412) 922-8920
	West	Dave Hyland	(415) 989-4023
International	Toronto	Don Maunder	(416) 366-1513
	U.K.	Bruce Pearson	(01) 759-9191
	Europe	Joe Gold	(022) 61-27-54
	Mexico	Andres Contreras	(905) 546-5179
	Asia	Don Haworth	(214) 233-1818
Non-IBM	Dallas	John Hallmark	(214) 233-1818

Greyhound Computer Corporation Greyhound Tower Phoenix, Arizona 85077

DISTRIBUTORS

WHY SELL ANOTHER INTELLIGENT TERMINAL WHEN YOU CAN SELL A POWERFUL TIME-SHARING VIDEO COMPUTER?



DISK BASED VIDEO COMPUTER

5th Generation Software
Field Proven — Available Today

You can supply distributed data processing, RJE, small business systems and dispersed data entry with our BASIC compiler -- an extended, multiuser, interactive compiler which automatically generates reentrant multiuser applications. It provides full screen I/O, string manipulation, decimal math, a sort verb, sequential and keyed file management and formatted I/O. Our time-sharing operating system supports the BASIC compiler and an editor, assembler, debugger, loader, communications, background processing, memory management, device independent I/O and over 40 utilities.

JACQUARD SYSTEMS
2502 Broadway, Santa Monica, Ca 90404 (213) 629-3493
93 Margerie, Meriden, Conn 06450 (203) 237-9100

Western Electric Improved

AT&T Expects 'Very Good' 1976

NEW YORK — AT&T will have a "very good" 1976, according to its chairman, John D. deButts, who cited improvements in Western Electric's earnings, AT&T's operating ratio and strong expense control as well as a reduction in the national rate of inflation.

The earnings of Western Electric, AT&T's manufacturing arm, "are improving and should be considerably better this year than they were last year," deButts said in a recent interview with the *Wall Street Journal.*

Bell's economists are forecasting national economic growth at 6.6% this year compared with a decline of 2% last year. The figures include the change in gross national product after adjustment for inflation.

The economists see the 1976 inflation rate cooling off to 5.8% compared with 9% last year, deButts said.

AT&T's operating ratio improved to 63.7% for the first five months this year compared with 65.3% a year ago, he added. The operating ratio is the portion of operating revenue needed to cover operating costs.

The firm's "expense control is better than it has ever been," deButts said. "We've really got a handle on this."

As an example of the "strong" budgeting system instituted, he noted the units last year began making five-year budgets.

Also, AT&T is initiating a "functional accounting" system that is expected to break out costs on such items as repair at customer premises.

AT&T intends to be competitive in private line communications and customer premises equipment, deButts said, through changes in rates and business practices if necessary.

CSC Doubles Quarter Net

EL SEGUNDO, Calif. — Computer Sciences Corp. (CSC) reported earnings more than doubled in the first quarter ended July 2.

Earnings jumped to almost $3.29 million or 23 cents a share compared with $1.52 million or 11 cents a share in the 1975 quarter.

First-quarter results included a special credit of $750,000 arising from the carryforward of a 1972 net operating loss.

This extraordinary credit is expected to continue in the remaining three quarters of the current year, the firm said.

Revenues in the quarter rose to $55.5 million from $50.4 million in the year-ago period.

The results "represent a continuation of CSC's strong earnings growth over the last three years," according to William R. Hoover, chairman and president.

Revenue growth accompanied by higher profit margins from operations and by a reduction of $250,000 in federal income taxes resulting from the commencement of a four-year amortization period for a $3.9 million investment tax credit carryforward contributed to the increase in quarter earnings, he added.

EMM Quarter Earnings Up Tenfold As Firm Erases Loss in Half-Year

LOS ANGELES — Electronic Memories & Magnetics Corp. (EMM) reported earnings for the second quarter were ten times those of the year-ago period despite a slight drop in revenues.

Figures for the six months reflected the same trend with earnings taking the place of a loss although revenues fell.

Earnings for the quarter were $1.3 million or 20 cents a share compared with $134,000 in the year-ago period.

The 1976 earnings included a $710,000 tax credit from loss on the sale of a subsidiary.

Revenues totaled $22.3 million compared with $25.2 million in the 1975 quarter.

The half-year earnings rose to $5.4 million or 92 cents a share, including an after-tax gain of $3.7 million on the sale of about one-half of EMM's holding of Sycor, Inc. common stock and the $710,000 tax credit.

This compared with a loss of $260,000 for the same six-month period in 1975.

Revenues for the six months were $43.2 million compared with $48.8 million in 1975.

EMM reported new order input continued strong for core and semiconductor memory products, with sales during the second quarter up 8% over the first quarter and order backlog increased by over 10% from the beginning of the year.

Applied Magnetics Net Rises 75% in Quarter

GOLETA, Calif. — Applied Magnetics Corp. reported earnings for the three months ended June 30 of $421,000 or 10 cents a share, a 75% gain over the $240,000 or 6 cents a share in the same 1975 period.

Revenues for the quarter totaled $16.05 million compared with $14.99 million in the year-ago quarter.

Nine-months earnings rose to $842,000 or 20 cents a share, a 68% increase over the $502,000 or 12 cents a share in the same period of 1975.

Revenues for the nine months slipped to $45.62 million compared with $46.94 million in the prior year.

VOLUME KEY PUNCHING
(402) 592-1686

"QUALITY AT LOWER COST"

AMERICANA KEY PUNCH
4345 South 89th St.
Omaha, Nebraska 68127

DEC

310+350

G/L A/R A/P PAYROLL
Applications Software

BUSINESS INFORMATION SYSTEMS, INC.
One Davis Blvd. Suite 507
Tampa, Fla. 33606
(813) 251-1563

MISSISSIPPI STATE CENTRAL DATA PROCESSING AUTHORITY

Sealed proposals will be received by the CDPA, 508 Robert E. Lee Bldg., Jackson, MS, 39202, up until 2:00 p.m. 8-30-76 for the following data processing equipment.

Request for Proposal No. 260 for the purchase of test booklets, answer sheets, and scoring services or software to provide scoring services for the Mississippi State Department of Education Statewide Standardized Testing Program.

Request for Proposal No. 261 for the lease or pur chase of a mark sense reader system for processing answer sheets to be used in the Missippi State Department of Education Statewide Standardized Testing Program.

Detailed specifications may be obtained from the CDPA office. The CDPA reserves the right to reject any and all bids and proposals and to waive informalities. Clyde P. Ballard, Executive Director, Central Data Processing Authority.

370/158 MOD K

AVAILABLE NOW

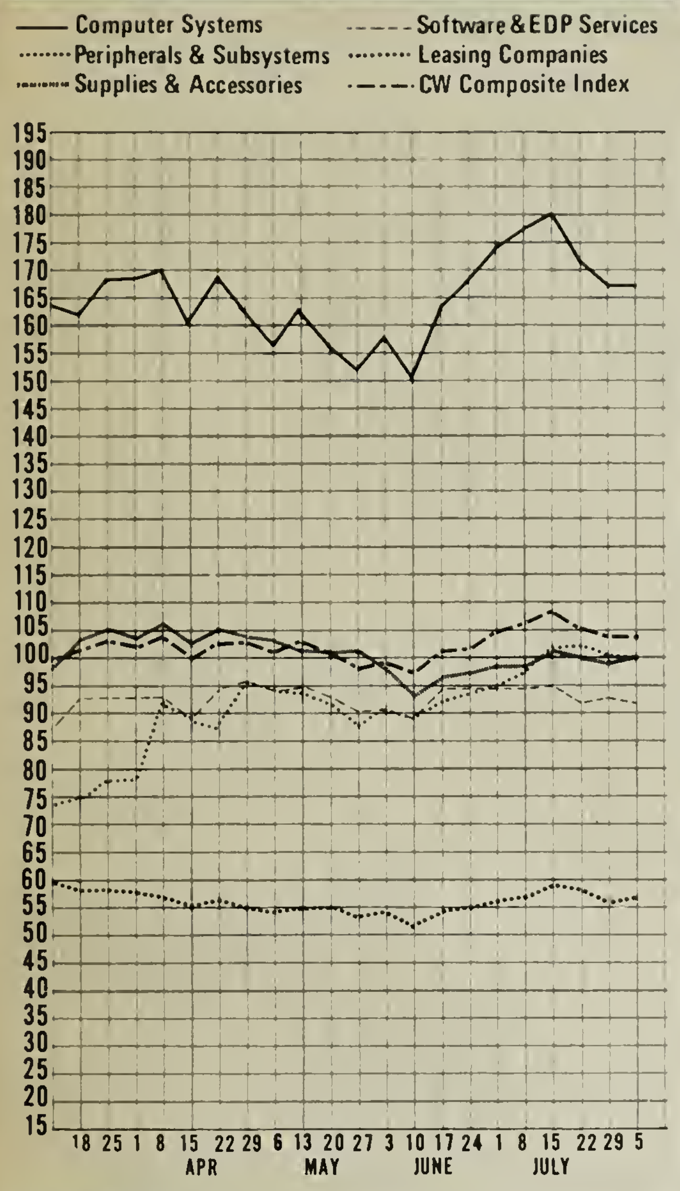
SHORT TERM DEAL

TERM: 31 MONTHS OR LESS
Attractive Rates

Call John Delaney, Fred Cholette
or Jim Hanly for details.

CIS Corp.
600 Mony Plaza
Syracuse, N.Y. 13202
(315) 425-1900

COMPUTERWORLD Computer Stocks Trading Indexes



Earnings Reports

COMPUDYNE
Three Months Ended March 31

	1976	1975
Shr Ernd	$.04	$.02
Revenue	10,699,172	10,031,989
Earnings	187,964	138,829
6 Mo Shr	.08	.05
Revenue	20,219,277	20,166,951
Earnings	365,777	271,611

COMPUTER NETWORK
Year Ended March 31

	1976	1975
Shr Ernd	$1.02	.....
Revenue	6,890,677	$3,821,947
Tax Cred	641,780	8,000
Earnings	1,330,519	(369,563)

COMPUTER USAGE
Three Months Ended March 31

	1976	1975
Shr Ernd	.....	$.19
Revenue	$2,048,887	1,235,184
Tax Cred	.....	55,500
Earnings	(96,456)	153,235
6 Mo Shr	.....	.42
Revenue	4,005,534	2,387,969
Tax Cred	.....	137,500
Earnings	(273,598)	327,088

COMTEN
Three Months Ended March 31

	1976	1975
Shr Ernd	$.05	$.02
Revenue	5,390,000	3,532,000
Tax Cred	40,000	25,000
Earnings	127,000	54,000

DECISION DATA COMPUTER
Year Ended Nov. 29

	1975	1974
Shr Ernd	.....	$.40
Revenue	$39,679,000	40,607,000
Tax Cred	.....	722,000
Earnings	(8,417,000)	1,511,000

DIGITAL COMPUTER CONTROLS
Three Months Ended May 31

	1976	1975
Shr Ernd	$.32	$.06
Revenue	4,846,149	2,339,393
Earnings	495,725	89,462

ELECTRONIC ASSISTANCE
Three Months Ended April 30

	1976	1975
Shr Ernd	$.16	.....
Revenue	9,464,000	$7,626,000
Disc Op	.....	(23,000)
Tax Cred	82,000	.....
Earnings	314,000	(233,000)

Computerworld Sales Offices

National Sales Manager
Roy Einreinhofer
Advertising Administrator
Judy Milford
COMPUTERWORLD
797 Washington Street
Newton, Mass. 02160
Phone: (617) 965-5800
Telex: USA-92-2529

Boston
Robert Ziegel
Northern Regional Manager
Mike Burman
Account Manager
COMPUTERWORLD
797 Washington Street
Newton, Mass. 02160
Phone: (617) 965-5800

New York
Donald E. Fagan
Eastern Regional Manager
Frank Gallo
Account Manager
COMPUTERWORLD
2125 Center Avenue
Fort Lee, N.J. 07024
Phone: (201) 461-2575

San Francisco
Bill Healey
Western Regional Manager
Jim Richardson
Account Manager
Donna Dezelan
Account Coordinator
COMPUTERWORLD
1212 Hearst Bldg.
San Francisco, Calif. 94103
Phone: (415) 495-0990

Los Angeles
Bill Healey
Western Regional Manager
Jim Richardson
Account Manager
Kathy Klein
Account Coordinator
1541 Westwood Boulevard
Los Angeles, Calif. 90024
(213) 477-3535

Japan:
Mr. Shigema Takahashi
General Manager
Dempa/Computerworld
1-11-15 Higashi Gotanda
Shinagawa-ku, Tokyo 141
Phone: (03) 445-6101
Telex: Japan-26792

United Kingdom:
Roger R. Frampton
Computerworld Publishing Ltd.
140-146 Camden Street
London NW1 9PF, England
Phone: (01) 485-2248
Telex: UK-26-47-37

West Germany:
Otmar Weber
Computerworld GmbH
8000 Munich 40
Tristanstrasse 11
West Germany
Phone: (089) 36-40-36
Telex: W.Ger-5-215250-HKFD

TRADE*QUOTES

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, AUGUST 4, 1976

All statistics compiled, computed and formatted by TRADE★QUOTES, INC. Cambridge, Mass. 02139

COMPUTER SYSTEMS

EXCH		PRICE 1976 RANGE (1)	CLOSE AUG 4 1976	WEEK NET CHNGE	WEEK PCT CHNGE
N	BURROUGHS CORP	84-108	95 1/4	- 1/2	-0.5
O	COMPUTER AUTOMATION	10- 19	16 7/8	+ 5/8	+3.8
N	CONTROL DATA CORP	18- 27	24 1/8	+1	+4.3
N	DATA GENERAL CORP	40- 60	51	- 1/4	-0.4
O	DATAPOINT CORP	24- 46	39 1/4	+1 1/4	+3.2
O	DIGITAL COMP CONTROL	2- 7	5 5/8	- 3/8	-6.2
N	DIGITAL EQUIPMENT	138-181	170 1/8	+ 1/8	0.0
N	ELECTRONIC ASSOC.	2- 5	3	+ 1/8	+4.3
A	ELECTRONIC ENGINEER.	7- 16	10	+ 1/4	+2.5
N	FOXBORO	28- 47	46 7/8	+3 1/8	+7.1
O	GENERAL AUTOMATION	5- 11	7 1/2	+1 1/8	+17.6
O	GRI COMPUTER CORP	1- 1	5/8	0	0.0
N	HEWLETT-PACKARD CO	95-117	106 3/4	-2 1/4	-2.0
N	HONEYWELL INC	34- 56	48	+ 5/8	+1.3
N	IBM	227-280	276 3/4	+3 3/4	+1.3
O	MANAGEMENT ASSIST	1- 3	2 1/4	+ 1/8	+5.7
O	MEMOREX	18- 33	26 7/8	+ 3/8	+1.4
O	MICRODATA CORP	10- 27	26	+2	+8.3
O	MODULAR COMPUTER SYS	5- 14	5 1/2	-5 3/4	-51.1
N	NCR	24- 36	34 1/8	+1	+3.0
O	PRIME COMPUTER INC	4- 14	13 1/4	- 3/4	-5.3
N	PERKIN-ELMER	19- 27	20 3/4	-1 3/8	-6.2
N	RAYTHEON CO	45- 66	63	+2 1/2	+4.1
N	SPERRY RAND	40- 52	46 7/8	+ 1/8	+0.2
O	SYCOR INC	20- 31	21 1/2	-1 1/2	-6.5
A	SYSTEMS ENG. LABS	6- 10	8 3/8	- 1/8	-1.4
N	VARIAN ASSOCIATES	13- 17	14 1/2	0	0.0
A	WANG LABS.	11- 20	15 1/2	0	0.0

LEASING COMPANIES

EXCH		PRICE 1976 RANGE (1)	CLOSE AUG 4 1976	WEEK NET CHNGE	WEEK PCT CHNGE
O	COMDISCO INC	3- 10	7 1/2	+ 1/4	+3.4
A	COMMERCE GROUP CORP	2- 3	2 3/4	- 1/8	-4.3
A	COMPUTER INVSTRS GRP	1- 3	2	+ 1/4	+14.2
M	DATRONIC RENTAL	1- 1	1 1/8	0	0.0
A	DCL INC	1- 1	5/8	0	0.0
N	DPF INC	5- 8	7 1/4	+ 1/8	+1.7
A	GREYHOUND COMPUTER	3- 8	7 1/8	- 1/8	-1.7
N	ITEL	6- 15	13 3/8	- 1/4	-1.8
N	LEASCO CORP	6- 19	17 1/4	+1 3/4	+11.2
O	LEASPAC CORP	0- 1	1/4	0	0.0
O	NRG INC	0- 1	3/8	- 1/8	-25.0
A	PIONEER TEX CORP	6- 9	7 1/4	- 1/8	-1.6
N	U.S. LEASING	7- 12	10 1/2	+ 1/4	+2.4

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

SOFTWARE & EDP SERVICES

EXCH		PRICE 1976 RANGE (1)	CLOSE AUG 4 1976	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	1- 2	1 3/8	0	0.0
O	ANACOMP INC	8- 11	8 1/2	+ 1/8	+1.4
A	APPLIED DATA RES.	2- 4	3 5/8	- 1/8	-3.3
N	AUTOMATIC DATA PROC	17- 35	34	+1	+3.0
O	COLEMAN AMERICAN COS	3- 6	3	0	0.0
O	COMPUTER DIMENSIONS	3- 7	5 1/2	+ 1/4	+4.7
O	COMP ELECTION SYSTMS	5- 9	6	- 1/2	-7.6
O	COMPUTER HORIZONS	1- 2	2	0	0.0
O	COMPUTER NETWORK	2- 6	3 1/2	+ 1/4	+7.6
N	COMPUTER SCIENCES	4- 8	6 5/8	0	0.0
O	COMPUTER TASK GROUP	1- 1	1 1/4	- 3/8	-23.0
O	COMPUTER USAGE	3- 6	2 3/4	- 1/8	-4.3
O	COMSHARE	2- 9	6 3/4	- 3/4	-10.0
O	DATA DIMENSIONS INC	2- 4	3	0	0.0
O	DATATAB	1- 1	1	+ 1/8	+14.2
N	ELECTRONIC DATA SYS.	12- 16	14 3/4	+1 5/8	+12.3
O	INFONATIONAL INC	1- 1	1/8	0	0.0
O	INSYTE CORP	1- 3	1 3/4	0	0.0
O	IPS COMPUTER MARKET.	1- 2	1 1/8	- 1/4	-18.1
O	KEANE ASSOCIATES	2- 4	3 3/8	0	0.0
O	KEYDATA CORP	2- 5	2 3/8	- 1/8	-5.0
O	LOGICON	4- 4	3 5/8	+ 1/8	+3.5
A	MANAGEMENT DATA	1- 3	2 1/4	0	0.0
A	NATIONAL CSS INC	13- 25	21 5/8	- 1/8	-0.5
A	ON LINE SYSTEMS INC	18- 22	19	+ 3/8	+2.0
N	PLANNING RESEARCH	3- 5	3 1/2	- 1/4	-6.6
O	PROGRAMMING & SYS	1- 1	3/8	0	0.0
O	RAPIDATA INC	2- 5	2 1/8	+ 1/8	+6.2
O	REYNOLDS & REYNOLD	13- 21	18 1/4	+ 1/2	+2.8
O	SCIENTIFIC COMPUTERS	1- 1	1/2	0	0.0
O	TYMSHARE INC	19- 28	26	+ 5/8	+2.4
A	URS SYSTEMS	3- 5	3 3/4	- 1/4	-6.2
N	WYLY CORP	2- 7	2 5/8	- 1/8	-4.5

PERIPHERALS & SUBSYSTEMS

EXCH		PRICE 1976 RANGE (1)	CLOSE AUG 4 1976	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADDRESSOGRAPH-MULT	8- 13	10	+ 1/4	+2.5
O	ADVANCED MEMORY SYS	4- 10	7 1/2	- 3/8	-4.7
N	AMPEX CORP	5- 10	8 5/8	0	0.0
O	ANDERSON JACOBSON	2- 4	2 5/8	- 1/8	-4.5
O	APPLIED DIG DATA SYS	13- 25	22	- 1/4	-1.1
O	BEEHIVE MEDICAL ELEC	3- 9	8	- 1/8	-1.5
A	BOLT,BERANEK & NEW	7- 11	9 3/8	- 1/8	-1.3
N	BUNKER-RAMO	5- 10	8 7/8	0	0.0
A	CALCOMP	4- 7	5 1/2	+ 1/8	+2.3
O	CAMBRIDGE MEMORIES	0- 6	7/8	+ 1/2	+133.3
N	CENTRONICS DATA COMP	20- 36	33 3/8	+2	+6.3
O	CODEX CORP	22- 42	32 1/2	+ 1/2	+1.5
O	COGNITRONICS	1- 1	7/8	0	0.0
O	COMPUTER COMMUN.	1- 5	5 5/8	+1 1/8	+25.0
O	COMPUTER CONSOLES	4- 7	5 1/2	- 1/4	-4.3
A	COMPUTER EQUIPMENT	1- 3	1 7/8	+ 1/4	+15.3
O	COMPUTER TRANSCEIVER	1- 3	7/8	- 1/8	-12.5
O	COMTEN	4- 9	8	0	0.0
N	CONRAC CORP	20- 25	22 7/8	- 7/8	-3.6
O	DATA ACCESS SYSTEMS	1- 4	3 1/4	0	0.0
O	DATA 100	7- 13	8 5/8	+ 1/2	+6.1
A	DATA PRODUCTS CORP	5- 15	14	+1	+7.6
O	DATA TECHNOLOGY	1- 2	1 3/8	- 1/8	-8.3
O	DATUM INC	1- 2	1 1/2	- 1/4	-14.2
O	DECISION DATA COMPUT	1- 4	1 3/4	- 1/4	-12.5
O	DELTA DATA SYSTEMS	1- 1	1	0	0.0
N	ELECTRONIC M & M	1- 3	3	0	0.0
O	FABRI-TEK	1- 1	3/4	0	0.0
O	GENERAL COMPUTER SYS	1- 2	1	0	0.0
N	HAZELTINE CORP	4- 12	9 3/8	- 1/8	-1.3
N	HARRIS CORP	34- 54	53 1/2	+2 1/2	+4.9
A	INCOTERM CORP	9- 20	10 1/4	+ 1/8	+1.2
O	INFOREX INC	3- 7	3 3/4	- 1/8	-3.2
O	INFORMATION INTL INC	10- 18	11 1/2	+ 1/8	+1.0
O	INTEL CORP	60-109	64	+1	+1.5
A	LUNDY ELECTRONICS	4- 7	4 1/8	- 1/4	-5.7
O	MSI DATA CORP	3- 7	6 5/8	- 1/4	-3.6
A	MILGO ELECTRONICS	15- 21	19 3/8	+ 7/8	+4.7
N	MOHAWK DATA SCI	3- 9	8 7/8	+1	+12.6
O	PENRIL CORP	1- 3	1 7/8	0	0.0
A	PERTEC CORP	3- 8	5 1/2	- 1/4	-4.3
A	POTTER INSTRUMENT	2- 2	1 3/4	0	0.0
O	PRECISION INST.	7- 10	5	0	0.0
O	QUANTOR CORP	4- 6	5	0	0.0
O	RECOGNITION EQUIP	6- 11	8 1/4	- 3/8	-4.3
N	SANDERS ASSOCIATES	6- 11	9 1/2	- 1/8	-1.2
O	SCAN DATA	2- 4	2 1/4	0	0.0
O	STORAGE TECHNOLOGY	9- 13	12 1/2	+ 5/8	+5.2
O	T BAR INC	5- 10	6	+ 1/4	+4.3
O	TALLY CORP.	4- 6	4 3/4	0	0.0
O	TEC INC	3- 5	3 3/4	0	0.0
N	TEKTRONIX INC	45- 67	65	-1 1/4	-1.8
N	TELEX	2- 5	3 1/4	- 3/8	-10.3
O	WANGCO INC	11- 22	21 1/8	0	0.0
O	WILTEK INC	2- 2	2 3/4	- 1/8	-4.3

SUPPLIES & ACCESSORIES

EXCH		PRICE 1976 RANGE (1)	CLOSE AUG 4 1976	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED SYSTEMS INC	1- 4	3 1/4	0	0.0
O	BALTIMORE BUS FORMS	3- 5	3 1/4	- 1/4	-7.1
A	BARRY WRIGHT	6- 10	7 7/8	- 1/8	-1.5
O	CYBERMATICS INC	1- 1	5/8	0	0.0
A	DATA DOCUMENTS	30- 42	29 3/4	- 1/4	-0.8
O	DUPLEX PRODUCTS INC	14- 24	14 3/8	- 5/8	-4.1
N	ENNIS BUS. FORMS	6- 8	6 5/8	+ 1/4	+3.9
O	GRAHAM MAGNETICS	8- 13	10	+1	+11.1
O	GRAPHIC CONTROLS	13- 19	15 1/2	+1	+6.8
N	3M COMPANY	53- 65	60	+ 1/8	+0.2
O	MOORE CORP LTD	40- 51	42	+1 1/2	+3.7
N	NASHUA CORP	11- 17	17 3/8	+1 1/8	+6.9
O	STANDARD REGISTER	15- 19	15 3/4	+ 1/4	+1.6
O	TAB PRODUCTS CO	5- 11	9 1/2	- 1/2	-5.0
N	UARCO	21- 25	21 1/2	0	0.0
A	WABASH MAGNETICS	4- 8	7 3/8	- 1/8	-1.6
N	WALLACE BUS FORMS	19- 25	20	- 1/4	-1.2

NINE COMPUTER SHOPPING CENTERS THAT BRING THE BUYERS TO YOU.

Going out of our way to be convenient to the vast majority of America's computer buyers has been our way since 1972. But the 1977 Caravan, our sixth national tour, will be more convenient than ever before. It will be visiting the largest computer markets in the U.S. with a three-day exhibition, buyers' forums and exhibitor seminars. For a majority of America's computer buyers, the Caravan will be as close as a daily commute. And approximately 75% of the people who buy computer products and services in the U.S. will be closer than 150 miles to one of the Caravan exhibition sites. This special convenience will make it easy for tens of thousands of important buyers and buying influences among users, OEM's and Systems Houses to meet a cross-section of the industry's most progressive companies. As an exhibitor, the Caravan can give you a highly efficient opportunity to qualify prospects, demonstrate your products and reinforce your corporate image, among other major marketing benefits.

Here's where we'll be going in 1977:

City	Dates
San Francisco	March 29-April 1
Los Angeles	April 5-7
Cleveland	April 19-21
Minneapolis/St. Paul	April 26-27
Chicago	May 3-5
New York	May 10-12
Philadelphia	May 24-26
Washington, D.C.	May 31-June 2
Boston	June 7-9

Exhibitor Participation Plans

There are several ways for you to participate in the 1977 Caravan, and you can choose the one most suited to your company's marketing needs. Most Caravan exhibitors get complete, national coverage with our full-tour, standard booth and complete package of support services. OEM exhibitors—or those who wish to cover major cities only—can exhibit in our Major City/OEM tours with a standard booth and complete support package. The five cities in the Major City/OEM tours are San Francisco, Los Angeles, Chicago, New York and Boston.

If you don't need a full booth to tell your story, then the minibooth is available at a mini price. The minibooth comes ready for participation in the Full Tour and the Major City/OEM Tour with a complete package of Caravan services. The minibooth offers you a unique advantage: it does not have to be manned in every city. So you get personal contact selling where you need it, and a travelling billboard where you don't. In the un-manned cities, the Caravan staff will stock your exhibit with your literature and sales aids, then collect inquiry cards from interested attendees and forward them on to you. Attendee-activated or continuous loop slide or film programs can be used to highlight your sales message in a graphic and memorable way. In those cities where you have field sales staff, they can man the exhibit and get the full benefit of face-to-face Caravan contact.

The Caravan Support Team

We've formed a special Caravan support team to make it easier than ever for you to be part of Caravan 77. They will help you clarify your objectives and expedite the details involved with your participation. They can give you expert advice on everything from designing your graphics to integrating the Caravan as a high performance tool in your overall marketing plans. An Account Executive from the Caravan support team will be available to work with your sales and management staff as soon as you've returned our Caravan Exhibit Space Reservation Agreement. So it'll pay you to sign up soon. Make the Caravan 77 a powerful accelerator of your market penetration next year.

For complete details on Computer Caravan 77 and an Exhibit Space Reservation form, send in the coupon below. Or call our National Sales Manager, Roy Einreinhofer, at (617) 965-5800.

TO: **Roy Einreinhofer**
National Sales Manager
The Computer Caravan
797 Washington Street
Newton, MA 02160

COMPUTER CARAVAN 77

☐ *Please send me more details on exhibiting in the 1977 Computer Caravan and an Exhibit Space Reservation Agreement.*

☐ *Please contact me.*

Name________________ Phone (____)__________

Title________________ Company____________

Address________________________________

City__________ State__________ Zip________